AutoMath

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Contents

1 Introduction

I developed some LaTeX code to allow some mathematical exercises to be generated in an automatical way. Some are also solved. Here are some examples of them. I designed by "**AutoMath**" the set of codes which allows you to typeset these exercises automatically.

If you want more pieces of information about the related code and a detailed bibliography, you may have a look at the document located at this URL:

http://orbi.ulg.ac.be/handle/2268/25122.

Please note that many improvements can be done, and that other exercises could be automatically generated with other methods: these ones are just an example.

2 Square Roots

Square root to simplify	Student's solution
$\sqrt{133111584}$	.....
$\sqrt{267147554}$	.....
$\sqrt{8319474}$	.....
$\sqrt{59160704}$	.....
$\sqrt{156221234}$	.....
$\sqrt{299501064}$	.....
$\sqrt{14790176}$	.....
$\sqrt{74875266}$	.....
$\sqrt{181179656}$	.....
$\sqrt{333703346}$	.....
$\sqrt{23109650}$	.....
$\sqrt{92438600}$	.....
$\sqrt{207986850}$	.....
$\sqrt{369754400}$	.....
$\sqrt{33277896}$	.....
$\sqrt{111850706}$	.....
$\sqrt{236642816}$	.....
$\sqrt{3697544}$	.....
$\sqrt{45294914}$	.....

3 Three Times Three Linear Systems

Solve the following system:

$$\begin{cases} -27x + -28y + 4z & = -4 \\ 36x + -40y + -29z & = 23 \\ 41x + 1y + -21z & = 42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -24y + 23z & = 31 \\ -3x + 4y + 21z & = -30 \\ -30x + 13y + -9z & = 31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -9y + -4z & = 43 \\ -39x + -14y + -3z & = -44 \\ -10x + 49y + 10z & = -10 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -13y + 37z & = 38 \\ 21x + -39y + 39z & = 17 \\ -18x + -29y + -14z & = 27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -34y + -6z & = 48 \\ -23x + -8y + 25z & = 49 \\ 40x + -12y + 36z & = 33 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 6y + 30z & = 13 \\ 21x + 37y + 6z & = 27 \\ 22x + -22y + -23z & = 16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -36y + 41z & = -39 \\ 49x + -20y + -32z & = 31 \\ 23x + 1y + -46z & = 6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -6y + -44z & = -24 \\ 36x + -1y + 4z & = -14 \\ 45x + 47y + -30z & = -5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -26y + 37z & = 1 \\ 24x + -34y + 13z & = -31 \\ 47x + 7y + 1z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 8y + -32z & = -47 \\ 18x + 45y + 41z & = -45 \\ -14x + -43y + 24z & = -34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -31y + 32z & = 8 \\ 2x + -50y + 17z & = -45 \\ 15x + -27y + 12z & = 45 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 37y + -25z & = 29 \\ 24x + -44y + -23z & = -17 \\ -38x + -4y + -17z & = -15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 49y + 13z & = 25 \\ -24x + 23y + -44z & = 1 \\ 20x + 48y + 2z & = -1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 39y + -17z & = 12 \\ 36x + 28y + 28z & = -32 \\ 5x + 7y + -18z & = 8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -49y + -45z &= -17 \\ 4x + 4y + -17z &= 14 \\ -8x + -25y + -23z &= -36 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + 42z &= -11 \\ 39x + 17y + -9z &= -12 \\ -29x + -46y + -25z &= -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -15y + 49z &= -11 \\ 25x + -34y + 10z &= 34 \\ 33x + 37y + -19z &= -25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -29y + -29z &= 47 \\ 15x + -14y + 25z &= -39 \\ -44x + -29y + -21z &= 6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -16y + 37z &= -19 \\ 14x + -28y + -1z &= 46 \\ -31x + 48y + -46z &= -17 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -44y + -29z &= -5 \\ 31x + -48y + -28z &= 22 \\ 21x + 7y + -32z &= 11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -22y + 26z &= -1 \\ 50x + 43y + 4z &= -32 \\ -20x + 50y + -50z &= -9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 34y + -17z &= -45 \\ 41x + -49y + -40z &= 12 \\ 45x + -40y + -39z &= 11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -6y + -34z &= 34 \\ -21x + -20y + -8z &= -49 \\ 45x + -12y + -13z &= 0 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -28y + -19z &= 19 \\ 50x + 39y + 42z &= -27 \\ 29x + -22y + -29z &= -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -45y + -38z &= -28 \\ -40x + 1y + -15z &= 33 \\ 35x + 19y + -21z &= -21 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -13y + -41z &= 27 \\ -49x + 12y + -15z &= -47 \\ -15x + -44y + -22z &= -19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -17y + 44z &= -40 \\ -48x + -41y + 31z &= 41 \\ -9x + 32y + -18z &= 42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 42y + -34z &= -44 \\ 28x + -44y + -14z &= -39 \\ -4x + -43y + 5z &= 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + 37z &= -22 \\ -8x + -9y + 8z &= 31 \\ -19x + -14y + -16z &= -46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -7y + 46z &= -34 \\ -46x + 16y + 1z &= 48 \\ -7x + -20y + 11z &= 18 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -29y + 9z &= 27 \\ -32x + 43y + -50z &= -23 \\ -31x + 36y + 43z &= 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + -42z &= 28 \\ -50x + 16y + -15z &= 43 \\ -28x + 3y + -35z &= -40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 16y + -43z &= -7 \\ -49x + 48y + 3z &= -12 \\ 40x + 43y + 10z &= 20 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 26y + 17z &= -37 \\ -8x + 7y + -7z &= 4 \\ -19x + -23y + 5z &= -14 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + 34z &= 45 \\ -50x + 44y + -9z &= 47 \\ -30x + 2y + -9z &= 14 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 50y + -45z &= -48 \\ -3x + -47y + 34z &= -1 \\ 44x + 17y + -16z &= -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 19y + -42z &= -28 \\ -39x + 46y + 14z &= 0 \\ 46x + -13y + 10z &= 23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -15y + 25z &= -7 \\ 16x + 13y + 9z &= 45 \\ 18x + 34y + -7z &= -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -14y + 25z &= 2 \\ 42x + -18y + 46z &= -18 \\ 31x + 1y + 46z &= -27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 5y + -6z &= -21 \\ -42x + 26y + 45z &= 31 \\ -11x + 12y + -11z &= -44 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 23y + -10z &= -9 \\ -38x + 29y + -20z &= -28 \\ 31x + -19y + -21z &= 15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -14y + -34z &= -43 \\ 42x + 23y + 5z &= -22 \\ 21x + 5y + 21z &= 50 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 31y + 14z &= -14 \\ -23x + -19y + 29z &= 28 \\ -13x + -16y + 38z &= -39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + 28z &= 40 \\ -49x + -34y + -13z &= -15 \\ 47x + -5y + 36z &= -42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 31y + 33z &= 36 \\ -49x + 9y + 4z &= 6 \\ -8x + -37y + 20z &= 25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 33y + 4z &= -33 \\ -16x + 17y + 38z &= 34 \\ -39x + -37y + 11z &= 11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 15y + -30z &= -40 \\ 48x + 7y + -11z &= 16 \\ 50x + 30y + -45z &= -12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 38y + -43z &= -43 \\ -39x + 4y + 8z &= 7 \\ 19x + -50y + -16z &= 48 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -9y + 42z &= -47 \\ -37x + -10y + 6z &= 14 \\ 5x + 39y + 2z &= -23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -16y + 16z &= -34 \\ 40x + -45y + -24z &= -46 \\ 18x + -36y + -46z &= 26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 29y + 3z & = -34 \\ 1x + 5y + 1z & = 4 \\ -47x + 45y + 42z & = 50 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -4y + -45z & = -50 \\ -47x + 36y + -38z & = 8 \\ 22x + 41y + 11z & = -19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 29y + -38z & = 33 \\ -12x + 45y + 15z & = -7 \\ 49x + 31y + -3z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 10y + 21z & = -23 \\ -30x + -13y + -2z & = -15 \\ 4x + -40y + -45z & = -40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -17y + 16z & = -31 \\ -43x + 9y + 34z & = 20 \\ -19x + -21y + -23z & = 48 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -48y + -49z & = 11 \\ -45x + 32y + -9z & = 11 \\ -47x + 43y + 14z & = 39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 3y + -18z & = -16 \\ 24x + 50y + 31z & = -43 \\ -20x + -49y + -11z & = 28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -23y + 29z & = 21 \\ 8x + 30y + 6z & = -25 \\ -35x + -9y + 29z & = 15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 17y + 25z & = 39 \\ 37x + 50y + 10z & = 0 \\ -42x + -6y + 35z & = -12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -37y + -35z & = 22 \\ -7x + 5y + -12z & = 50 \\ -35x + -43y + 49z & = -40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + -34z & = -7 \\ -11x + -1y + 43z & = -32 \\ -50x + 27y + -30z & = -16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 26y + 29z & = 37 \\ -25x + 32y + 8z & = -50 \\ -18x + 26y + -4z & = 29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 5y + -1z & = 32 \\ 28x + -35y + -25z & = -43 \\ -3x + -50y + -41z & = 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 16y + 27z & = 23 \\ -48x + 47y + -7z & = -45 \\ -28x + -28y + -33z & = -4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 10y + -11z & = 7 \\ -5x + -13y + 26z & = 10 \\ -44x + -8y + 43z & = -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -32y + -7z & = 26 \\ 35x + -42y + 4z & = 10 \\ -50x + -8y + 3z & = 21 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + 4z & = -8 \\ 6x + 29y + 34z & = 8 \\ 33x + -17y + 34z & = -48 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 50y + -4z & = 36 \\ 32x + -48y + 13z & = 23 \\ -23x + 27y + -43z & = -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -9y + 36z & = -38 \\ 34x + 44y + -25z & = -47 \\ -47x + 46y + 38z & = -8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -38y + -6z & = -36 \\ -24x + -40y + -9z & = -38 \\ -12x + 28y + 45z & = -4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 48y + 45z & = -39 \\ -11x + 44y + -47z & = 12 \\ -23x + -37y + 43z & = -2 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -28y + 6z & = -23 \\ -3x + -29y + 32z & = -41 \\ -36x + 48y + 37z & = -4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -46y + -23z & = 0 \\ 42x + -9y + -28z & = 49 \\ -47x + -13y + 4z & = -28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + 20z & = 42 \\ -30x + -36y + -12z & = 39 \\ 26x + 3y + -42z & = -25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -42y + -26z &= -50 \\ -5x + -22y + 6z &= 10 \\ 11x + 3y + 21z &= -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + -37z &= -30 \\ -9x + 43y + 17z &= 17 \\ -20x + -15y + -29z &= 40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 23y + 12z &= 15 \\ 19x + 33y + -8z &= 6 \\ -44x + 37y + 7z &= 13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 28y + 9z &= 18 \\ -37x + 5y + -13z &= 6 \\ 27x + -20y + 49z &= 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 31y + -39z &= 27 \\ -38x + 14y + -36z &= -50 \\ -40x + -7y + -18z &= 33 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + 29z &= -19 \\ -46x + 48y + 33z &= -43 \\ -35x + -31y + 27z &= 39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -21y + -24z &= -1 \\ 44x + -4y + -35z &= -24 \\ 26x + 49y + -49z &= -9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + 42z &= 48 \\ -19x + -25y + 37z &= 0 \\ 21x + -8y + 45z &= 8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 3y + -34z &= 21 \\ -50x + 42y + -18z &= -37 \\ 15x + 28y + -29z &= 49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -4y + -11z &= -46 \\ 2x + 14y + 15z &= -7 \\ -5x + -3y + 37z &= -43 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -7y + 28z &= 28 \\ -4x + 45y + -49z &= 10 \\ -1x + -32y + -16z &= 4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -46y + -50z &= -16 \\ 32x + 41y + 5z &= 2 \\ -48x + 21y + -13z &= -17 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 42y + -15z & = 34 \\ -14x + 14y + -13z & = -5 \\ 10x + -49y + 48z & = 27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 49y + 15z & = 5 \\ -32x + -3y + -3z & = -26 \\ 23x + 4y + -33z & = -15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 38y + -7z & = -27 \\ -29x + 20y + -29z & = 24 \\ 25x + 2y + 6z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 1y + -6z & = 18 \\ -32x + -40y + -9z & = 5 \\ -31x + -42y + -29z & = 50 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -40y + 49z & = 3 \\ 46x + 37y + 23z & = -24 \\ -42x + 5y + 3z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 29y + -29z & = 21 \\ -34x + -11y + 44z & = 41 \\ 33x + 19y + -12z & = 3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 39y + -10z &= -10 \\ 22x + 43y + -12z &= 45 \\ -21x + 32y + -14z &= -47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -44y + 12z &= -47 \\ -45x + 22y + 27z &= -3 \\ 1x + 34y + 2z &= 26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -20y + 22z &= 31 \\ 27x + 25y + 38z &= 16 \\ -18x + 41y + -4z &= -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -37y + 42z &= 23 \\ 3x + -36y + 30z &= -19 \\ 10x + 35y + -46z &= 11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -28y + 25z &= -5 \\ 46x + 5y + 11z &= -42 \\ -6x + 6y + 10z &= -5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -17y + 42z &= 41 \\ 34x + -23y + 14z &= 6 \\ -18x + 4y + -39z &= -22 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -24y + 44z & = -12 \\ -29x + -27y + -48z & = -30 \\ -1x + -8y + 48z & = 19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + 45z & = 50 \\ -19x + 33y + -10z & = 16 \\ -10x + -29y + -20z & = 10 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -43y + 22z & = -6 \\ -44x + -5y + 33z & = 21 \\ 50x + 20y + -32z & = -46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 15y + -24z & = -42 \\ -41x + 28y + 25z & = -28 \\ 21x + -45y + 33z & = -11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 47y + -49z & = -13 \\ 5x + 16y + -9z & = -34 \\ -4x + 36y + -46z & = -48 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 24y + -32z & = 25 \\ -6x + -34y + 46z & = 48 \\ 49x + -45y + -43z & = -36 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -47y + 6z & = -9 \\ -12x + -33y + -38z & = -22 \\ 48x + -43y + 10z & = 36 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 1y + 46z & = 8 \\ -27x + -10y + 50z & = -49 \\ 49x + -43y + -30z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 38y + -4z & = -16 \\ -11x + 39y + 11z & = -46 \\ -47x + 3y + -41z & = -4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -3y + 43z & = 42 \\ -7x + 33y + -28z & = 37 \\ -36x + -4y + -33z & = 4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -7y + -12z & = -6 \\ -44x + -46y + 36z & = 49 \\ -31x + -37y + 36z & = 16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 27y + -39z & = 50 \\ 2x + -40y + -25z & = -49 \\ -50x + 30y + -10z & = 5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 40y + 33z & = -6 \\ -7x + -23y + 43z & = 36 \\ -26x + 47y + -37z & = 25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -48y + 45z & = -47 \\ -35x + -40y + 42z & = 22 \\ 31x + -31y + -6z & = 9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 36y + -12z & = 0 \\ 39x + 23y + -29z & = -46 \\ 20x + -28y + -50z & = 32 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 8y + -24z & = -17 \\ -21x + 8y + -39z & = -22 \\ 15x + 39y + 25z & = -22 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + 10z & = 49 \\ 41x + -42y + -35z & = 31 \\ 19x + 14y + 22z & = 47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -35y + 33z & = 48 \\ -26x + -26y + 33z & = -7 \\ 3x + 5y + 34z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 26y + -11z & = -3 \\ -5x + -30y + -42z & = 1 \\ 38x + 33y + -47z & = 12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 17y + 24z & = -16 \\ 10x + -49y + 33z & = 4 \\ -15x + 26y + 42z & = -37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 50y + -17z & = 13 \\ 20x + -27y + -8z & = -30 \\ -24x + -36y + 45z & = 31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -29y + -28z & = 18 \\ 26x + 19y + -21z & = 29 \\ -14x + -49y + -45z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -36y + 50z & = 0 \\ 35x + 26y + -27z & = -10 \\ -17x + -16y + 20z & = 34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -10y + 24z & = 36 \\ -24x + 48y + 25z & = -24 \\ 45x + 32y + 8z & = 45 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 11y + -10z &= -5 \\ -50x + 39y + 43z &= -24 \\ -40x + -13y + 1z &= 36 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 36y + -14z &= -26 \\ 2x + -11y + -29z &= 50 \\ 8x + 39y + -19z &= 40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 33y + 26z &= -10 \\ 11x + -31y + 13z &= 42 \\ -50x + -14y + -13z &= -21 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -8y + -36z &= 13 \\ -18x + 40y + -41z &= -17 \\ -27x + -47y + 32z &= -26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + -37z &= 27 \\ 43x + 38y + 13z &= 26 \\ 16x + -37y + 38z &= -36 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + 16z &= -29 \\ -35x + -27y + -42z &= -5 \\ -40x + 23y + -34z &= -23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -11y + 14z &= 9 \\ 3x + 39y + -20z &= 31 \\ -12x + 35y + -11z &= 46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 45y + -6z &= -16 \\ -10x + -36y + 46z &= 47 \\ 19x + 23y + 44z &= 38 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -25y + -11z &= -39 \\ -14x + 39y + -44z &= -18 \\ -27x + -46y + -36z &= 49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -31y + 34z &= 32 \\ -29x + 14y + -12z &= 49 \\ 10x + -28y + -26z &= 49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 29y + -5z &= -11 \\ 14x + -26y + 20z &= 49 \\ -27x + 11y + 31z &= 40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 45y + 15z &= -38 \\ -41x + -14y + 34z &= 34 \\ -44x + 18y + 40z &= -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 33y + 32z & = -27 \\ -34x + -8y + -12z & = -15 \\ -40x + -46y + -26z & = -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -18y + 2z & = 4 \\ 48x + 27y + -4z & = -1 \\ -20x + -3y + -45z & = 27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 15y + 22z & = 36 \\ -16x + -11y + -39z & = -41 \\ 36x + 12y + 36z & = -19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 23y + 39z & = 11 \\ -3x + 47y + 4z & = 3 \\ -5x + -48y + -40z & = 2 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -7y + 21z & = -43 \\ 1x + 6y + 9z & = -5 \\ 4x + -14y + 34z & = -43 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 39y + 12z & = 31 \\ 32x + 19y + -38z & = 20 \\ 43x + -48y + -47z & = 24 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -5y + -40z &= -15 \\ -13x + -45y + 32z &= 36 \\ 25x + -42y + -15z &= -32 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -20y + -48z &= 20 \\ 37x + -18y + 42z &= -25 \\ 39x + -23y + -23z &= 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 33y + 40z &= 35 \\ 38x + -40y + 15z &= 7 \\ 42x + 49y + -16z &= 26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -24y + 22z &= 36 \\ -18x + -39y + -33z &= 14 \\ 45x + 29y + -35z &= -23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -33y + -42z &= -43 \\ 14x + -46y + -34z &= 40 \\ -21x + -34y + -29z &= 23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -25y + -40z &= 9 \\ 44x + -45y + -49z &= 32 \\ 21x + -2y + 47z &= 2 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -12y + -36z &= -4 \\ 44x + -33y + 42z &= -42 \\ 4x + -27y + -34z &= 45 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -49y + 50z &= 4 \\ 24x + -40y + 22z &= -3 \\ 18x + -36y + 41z &= 44 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 17y + 5z &= -45 \\ 16x + 33y + -4z &= 13 \\ 33x + 21y + 14z &= 26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 7y + 10z &= 32 \\ -10x + -38y + 27z &= -33 \\ -26x + -39y + 8z &= 28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + 48z &= -25 \\ -17x + -32y + 6z &= 44 \\ 43x + 6y + -14z &= 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -24y + -50z &= 26 \\ 10x + 42y + -19z &= 13 \\ -26x + 22y + 48z &= 19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -29y + -32z & = -1 \\ -18x + 36y + 22z & = 8 \\ -41x + -31y + 4z & = -7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 8y + -19z & = -33 \\ -17x + -43y + -34z & = -6 \\ -48x + -1y + -45z & = -1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -5y + 24z & = -29 \\ -46x + 42y + -11z & = -33 \\ 25x + 32y + -18z & = 6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -16y + -6z & = 25 \\ 20x + 7y + 36z & = -34 \\ 47x + -50y + 39z & = 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 41y + 37z & = -48 \\ -19x + -3y + 41z & = 19 \\ 25x + 22y + -48z & = 6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -1y + 20z & = -29 \\ -50x + 41y + 47z & = 42 \\ -46x + -37y + -8z & = -47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -1y + 3z & = -30 \\ -32x + 47y + -17z & = -4 \\ 40x + -8y + -39z & = -13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 7y + -30z & = 4 \\ -18x + -21y + -39z & = -39 \\ -19x + 28y + 30z & = 9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -43y + 48z & = 8 \\ 34x + 38y + -39z & = -13 \\ -42x + 42y + 7z & = -19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 36y + -14z & = 31 \\ -38x + 5y + 16z & = -28 \\ 40x + -22y + -45z & = -50 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -2y + -47z & = 13 \\ -50x + 41y + -6z & = 47 \\ 14x + -23y + -18z & = -20 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -7y + 10z & = 43 \\ 22x + 40y + -2z & = 38 \\ -41x + -39y + 18z & = 22 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -4y + 13z &= 13 \\ -15x + 26y + 27z &= 49 \\ 21x + 22y + -34z &= -26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 34y + 3z &= 47 \\ -26x + -30y + -42z &= -21 \\ 37x + -10y + -24z &= -37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 38y + -28z &= -37 \\ -34x + -41y + 16z &= -18 \\ 35x + -17y + -41z &= 15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -10y + -18z &= -25 \\ 44x + 50y + 40z &= -6 \\ 12x + 34y + -19z &= 25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -42y + -20z &= -23 \\ -13x + 48y + -46z &= 46 \\ 34x + -43y + -13z &= 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 27y + 27z &= -31 \\ 36x + 42y + -14z &= 17 \\ -11x + 34y + -44z &= 34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 40y + 1z & = -17 \\ -35x + -5y + -19z & = 21 \\ -3x + 24y + -1z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -26y + 20z & = -41 \\ 22x + -47y + 33z & = -9 \\ 17x + -42y + -10z & = -42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + -33z & = -30 \\ 34x + 22y + 21z & = 25 \\ 45x + -3y + -29z & = 40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -35y + 26z & = 41 \\ 8x + 49y + 34z & = 34 \\ 31x + 31y + 4z & = 14 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -15y + -45z & = 33 \\ -42x + -19y + 44z & = 37 \\ -14x + 16y + 26z & = 29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + 41z & = 24 \\ 32x + 42y + 44z & = -27 \\ 27x + 49y + -14z & = -37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 7y + -44z & = 27 \\ -45x + -41y + 30z & = 10 \\ -15x + -5y + -21z & = 42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -49y + 3z & = -12 \\ -32x + -17y + 43z & = -36 \\ 24x + 3y + 45z & = -34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 48y + -4z & = -18 \\ 41x + -10y + 42z & = -5 \\ 33x + 47y + 34z & = 45 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -32y + -41z & = -20 \\ 10x + -46y + -27z & = -10 \\ 41x + 16y + 7z & = 8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -18y + 37z & = -34 \\ 3x + -40y + 20z & = 11 \\ -32x + 20y + -15z & = 5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -3y + 44z & = 23 \\ 5x + 34y + 22z & = -48 \\ -37x + 42y + -33z & = -12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -28y + 5z & = 45 \\ -4x + 2y + 14z & = -42 \\ -47x + -48y + 31z & = -23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -25y + -38z & = 25 \\ -29x + 10y + 14z & = 18 \\ -33x + 23y + 45z & = 25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -14y + -28z & = 18 \\ 35x + 23y + -6z & = -25 \\ -3x + 29y + -2z & = -41 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -27y + 32z & = 8 \\ -20x + -21y + 8z & = 19 \\ 15x + -31y + 8z & = -29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -36y + 40z & = 28 \\ 42x + 30y + 18z & = -4 \\ 25x + -33y + 23z & = 33 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -2y + 33z & = -39 \\ 6x + -22y + 25z & = -23 \\ 23x + 18y + -5z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 8y + 2z & = 30 \\ -21x + 33y + -5z & = 24 \\ 3x + 28y + 22z & = -5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 17y + 20z & = -33 \\ -35x + 30y + 22z & = 7 \\ 7x + 12y + 47z & = 20 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 18y + 49z & = 36 \\ -29x + 18y + -41z & = -17 \\ -9x + -19y + 4z & = 41 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -9y + -17z & = 1 \\ 48x + -45y + 33z & = 16 \\ 5x + -47y + -34z & = -28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -41y + -3z & = 28 \\ 8x + -19y + -31z & = 45 \\ 27x + -31y + -9z & = -6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 37y + 49z & = -22 \\ -22x + -45y + -28z & = -47 \\ 43x + 34y + -7z & = 31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + -34z &= -8 \\ -7x + -13y + 20z &= 14 \\ -18x + -43y + -50z &= -47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -11y + 19z &= -2 \\ -48x + 32y + -6z &= -36 \\ 13x + -31y + -1z &= 43 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -13y + -4z &= -49 \\ 10x + -34y + -28z &= 19 \\ 12x + -31y + -39z &= 15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 22y + 3z &= -16 \\ 48x + 17y + 32z &= 32 \\ 4x + -40y + -24z &= 38 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -6y + -32z &= -44 \\ 41x + 2y + 38z &= 24 \\ 32x + -4y + -28z &= -27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 27y + -27z &= 24 \\ 33x + -13y + 29z &= -34 \\ -33x + -11y + -36z &= 34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -7y + 17z & = -22 \\ 47x + -23y + -34z & = -23 \\ -44x + 42y + 13z & = 6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 13y + 25z & = 33 \\ 4x + 42y + 31z & = 48 \\ -24x + -40y + 16z & = 14 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -5y + 42z & = -8 \\ 28x + 30y + 13z & = 28 \\ 47x + -28y + 47z & = 2 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -12y + -36z & = 17 \\ -48x + 34y + 16z & = 41 \\ -22x + 32y + 28z & = 23 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -1y + 26z & = 42 \\ 37x + 22y + 41z & = -34 \\ -42x + 43y + -26z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 6y + 32z & = 17 \\ 18x + -46y + -40z & = 4 \\ 39x + -34y + 37z & = -26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -4y + 38z &= -33 \\ 49x + -24y + 44z &= -1 \\ 5x + 45y + -31z &= -37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -20y + -18z &= 50 \\ -45x + -25y + 12z &= -46 \\ 22x + -33y + -15z &= -42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -11y + 4z &= 19 \\ 3x + 11y + -38z &= 6 \\ -20x + -45y + -3z &= 28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -37y + 46z &= 4 \\ 41x + 4y + -49z &= -39 \\ 43x + -41y + -2z &= 33 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 25y + -22z &= -26 \\ -50x + -38y + -47z &= 11 \\ -42x + 32y + -14z &= -46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + 4z &= 29 \\ 33x + 14y + 49z &= 38 \\ -25x + -1y + -10z &= -4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -49y + 37z &= 29 \\ -42x + -40y + 33z &= -27 \\ 20x + -35y + -26z &= -34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 26y + 43z &= 16 \\ -12x + -10y + 50z &= -26 \\ -42x + 4y + 32z &= 34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -29y + -34z &= 41 \\ 8x + 1y + -31z &= -40 \\ 47x + 47y + 28z &= 44 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -11y + -10z &= -11 \\ 13x + -28y + -8z &= 11 \\ -15x + 1y + -6z &= 9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 12y + 12z &= -32 \\ -10x + -36y + 30z &= 14 \\ 4x + -27y + 34z &= -35 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 3y + -41z &= 50 \\ -11x + 30y + -8z &= 44 \\ -25x + -22y + -19z &= -13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + -7z & = 23 \\ 29x + -24y + -23z & = 13 \\ -7x + -43y + -14z & = -12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 21y + 7z & = 47 \\ -33x + 24y + 22z & = -44 \\ 43x + -19y + 11z & = 39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 23y + -50z & = 3 \\ -14x + 14y + 49z & = 40 \\ -20x + -22y + 34z & = -46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 31y + -11z & = -27 \\ -5x + -35y + 26z & = 19 \\ 7x + -3y + -7z & = -47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -9y + 3z & = -14 \\ -12x + 12y + -1z & = 37 \\ 5x + 41y + 11z & = -34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -18y + -29z & = 29 \\ -4x + -32y + 47z & = -26 \\ 28x + -16y + 50z & = -24 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -40y + 7z & = -14 \\ 48x + 41y + -10z & = -43 \\ 36x + 25y + -26z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -6y + -8z & = -18 \\ 29x + 31y + 48z & = 15 \\ 23x + -16y + 23z & = -16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -25y + -16z & = 39 \\ -4x + 34y + 24z & = -35 \\ 35x + -44y + -20z & = 4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 20y + 6z & = -43 \\ 4x + -8y + 31z & = -9 \\ -6x + -12y + 27z & = -43 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -38y + 1z & = -17 \\ 32x + -15y + 22z & = 40 \\ -29x + -13y + 22z & = 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -33y + -17z & = -5 \\ -13x + -37y + -6z & = -49 \\ 30x + -23y + -24z & = 27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -33y + -22z & = 28 \\ -34x + -11y + -8z & = -19 \\ -43x + -33y + 40z & = 31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -9y + -24z & = 27 \\ -20x + -8y + -49z & = 3 \\ -27x + 26y + -11z & = -11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 8y + 45z & = -40 \\ -1x + 38y + 2z & = 23 \\ 47x + 9y + 6z & = 49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -39y + 14z & = 45 \\ 44x + -22y + -11z & = 12 \\ -26x + 28y + 23z & = 15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + -45z & = 32 \\ 26x + -39y + -3z & = 26 \\ -27x + -30y + 13z & = 34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -10y + 13z & = -14 \\ -16x + -26y + -28z & = 11 \\ -47x + -39y + 1z & = 11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 6y + -41z & = 45 \\ -18x + -25y + -30z & = 49 \\ 14x + 36y + 36z & = 19 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -34y + 4z & = -16 \\ 22x + 37y + 5z & = 12 \\ -2x + 9y + 46z & = 29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -21y + -23z & = -19 \\ 11x + 3y + -48z & = -37 \\ 21x + 30y + 7z & = -30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -12y + 50z & = 44 \\ 3x + 18y + 2z & = -27 \\ -42x + -29y + -34z & = -40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 29y + 19z & = 2 \\ -28x + 43y + -22z & = 47 \\ -49x + -6y + -41z & = -5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 46y + 26z & = 12 \\ 15x + 32y + 21z & = 23 \\ -4x + -10y + -1z & = -8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -28y + 4z & = 20 \\ 8x + -4y + 12z & = -7 \\ 10x + -17y + 29z & = 24 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -38y + -44z & = -8 \\ 12x + -25y + -9z & = -37 \\ 6x + 44y + 2z & = -32 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -20y + -6z & = -7 \\ 6x + 43y + 44z & = 36 \\ -35x + 34y + -23z & = -7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -15y + -2z & = 39 \\ -1x + 25y + 29z & = -34 \\ -3x + 11y + -15z & = -42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + 27z & = -7 \\ 12x + 46y + 20z & = 27 \\ -22x + 38y + 11z & = -26 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -33y + 11z & = 30 \\ -12x + -4y + -23z & = 24 \\ -20x + 37y + -16z & = 13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -42y + -19z &= 18 \\ -7x + 29y + 14z &= -21 \\ 11x + 11y + -36z &= 8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -26y + 49z &= 39 \\ 26x + -8y + -42z &= 43 \\ -22x + -48y + -25z &= -42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 11y + -8z &= -4 \\ 22x + 8y + 23z &= -1 \\ 16x + 16y + 22z &= 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -6y + -1z &= 11 \\ -42x + 32y + -18z &= 40 \\ -26x + -34y + 36z &= -47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -42y + 47z &= -3 \\ 8x + -38y + -3z &= -1 \\ 1x + -26y + -31z &= 12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -36y + 45z &= 18 \\ 5x + -50y + 34z &= 45 \\ 3x + -29y + 13z &= -17 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -20y + -31z &= -7 \\ -5x + 11y + 2z &= 42 \\ 16x + -17y + 47z &= 16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 4y + -11z &= 16 \\ 16x + -25y + 4z &= -19 \\ 32x + -44y + -15z &= -37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 10y + -24z &= 48 \\ -42x + -3y + 21z &= -19 \\ 41x + -46y + -17z &= -34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -35y + -21z &= -48 \\ -15x + 23y + -44z &= 5 \\ 42x + 38y + 44z &= -22 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 7y + -15z &= -31 \\ 43x + 50y + -35z &= -34 \\ 14x + 17y + -44z &= 39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + -36z &= 8 \\ 34x + 38y + 1z &= -12 \\ 5x + 50y + 23z &= -8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 1y + -14z & = -20 \\ -28x + 49y + -24z & = 27 \\ -12x + 13y + -25z & = -12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 15y + 46z & = 49 \\ 5x + -9y + -21z & = -31 \\ 41x + 34y + -38z & = -40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -42y + 24z & = -6 \\ 13x + -32y + -8z & = 31 \\ -10x + -48y + 13z & = 4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -49y + -37z & = 35 \\ 36x + 37y + 10z & = -7 \\ 9x + -28y + 17z & = -48 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -12y + -40z & = 17 \\ -13x + -22y + 36z & = 1 \\ -9x + 14y + 49z & = -6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -31y + -40z & = -14 \\ 47x + 32y + -42z & = -45 \\ 4x + -16y + -7z & = -7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 29y + 42z & = -48 \\ -10x + -12y + 6z & = -45 \\ 43x + -19y + -50z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 25y + 27z & = -4 \\ -18x + -10y + 50z & = 46 \\ -9x + -50y + -8z & = -44 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + -39z & = 23 \\ -38x + 46y + 41z & = -40 \\ 34x + -2y + 13z & = 18 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + 38z & = -22 \\ -10x + -26y + -47z & = 46 \\ 21x + -12y + -40z & = -21 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 1y + 30z & = -27 \\ -34x + 24y + -4z & = 42 \\ -18x + -16y + -8z & = 30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 49y + -31z & = 26 \\ 16x + 13y + -47z & = 16 \\ -11x + -12y + -12z & = -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -40y + 21z & = 20 \\ -17x + -33y + 26z & = 11 \\ -47x + -5y + -33z & = -48 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -40y + 12z & = -2 \\ 38x + -6y + -12z & = -34 \\ 20x + 10y + -31z & = -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + 48z & = 21 \\ 10x + -26y + -34z & = -47 \\ -25x + 40y + 44z & = -9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -26y + -6z & = -16 \\ -33x + 37y + 14z & = 50 \\ 22x + 22y + 39z & = -18 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 5y + -37z & = 20 \\ 40x + 36y + -50z & = -27 \\ 12x + -17y + -44z & = -29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -44y + 28z & = 11 \\ 48x + -4y + 42z & = 14 \\ -11x + 15y + -4z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + 20z & = 0 \\ -7x + 10y + -19z & = 7 \\ 7x + 12y + -29z & = -37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 8y + 49z & = -36 \\ 40x + 13y + -11z & = -22 \\ 37x + 42y + -45z & = -10 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 10y + -28z & = -31 \\ -37x + 42y + -44z & = -29 \\ 4x + -3y + -9z & = -7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + -15z & = -32 \\ -33x + 50y + 41z & = 29 \\ 3x + -12y + -4z & = -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 39y + -29z & = -28 \\ 39x + -38y + 38z & = 50 \\ 50x + 27y + 41z & = 24 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -8y + -7z & = -44 \\ 41x + -46y + -36z & = -23 \\ -6x + 5y + 38z & = 8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 3y + 38z & = -49 \\ -2x + -25y + -5z & = 34 \\ 25x + -15y + 2z & = 49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -41y + -6z & = -35 \\ -22x + -7y + -3z & = 43 \\ 38x + 27y + -35z & = 10 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 49y + -19z & = 22 \\ 34x + -9y + -17z & = 5 \\ 23x + 13y + 25z & = 37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -22y + 43z & = -5 \\ 46x + 31y + -42z & = 48 \\ 39x + 31y + -46z & = 30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 27y + -40z & = -43 \\ 22x + 24y + 46z & = 36 \\ 44x + -4y + 36z & = -44 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 10y + -48z & = -26 \\ -37x + 34y + 39z & = -21 \\ 27x + -39y + -28z & = -29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 5y + 23z & = 12 \\ -49x + -9y + 15z & = 23 \\ -32x + -15y + 42z & = -29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -40y + -3z & = -19 \\ -42x + -5y + 16z & = -3 \\ -26x + -18y + 23z & = 18 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 18y + -27z & = -46 \\ 28x + -26y + 8z & = -41 \\ -13x + 22y + 43z & = 12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + -1z & = -5 \\ -49x + -37y + 9z & = -44 \\ -36x + 8y + 39z & = 0 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -10y + 10z & = 43 \\ -3x + 36y + -18z & = 24 \\ 19x + 50y + 28z & = 46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -40y + 27z & = -18 \\ 48x + -9y + -37z & = -33 \\ 10x + -39y + -8z & = 12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -30y + 24z & = -29 \\ -48x + 40y + 20z & = 45 \\ 36x + 22y + -38z & = 42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 5y + -1z & = 19 \\ -41x + -48y + 40z & = -13 \\ 16x + -32y + -37z & = -16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 15y + -46z & = 36 \\ 2x + -20y + 36z & = 36 \\ 4x + -49y + 1z & = -5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 46y + -21z & = -45 \\ 48x + 30y + -16z & = -12 \\ -35x + -35y + -37z & = 27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + -46z & = 30 \\ 38x + 40y + 20z & = -49 \\ 17x + 37y + 5z & = 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 48y + -38z & = -35 \\ 27x + 42y + 29z & = 10 \\ -32x + 29y + 44z & = 11 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 20y + -40z &= -29 \\ 1x + 34y + -39z &= 11 \\ -19x + 2y + -34z &= 0 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 6y + -28z &= 22 \\ 28x + -7y + 23z &= 7 \\ 43x + -34y + -14z &= 39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -10y + 26z &= 21 \\ 50x + -14y + 24z &= -22 \\ 45x + -35y + 31z &= -5 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 14y + -9z &= 46 \\ -36x + 36y + 11z &= 20 \\ 12x + 49y + -27z &= -15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 19y + -47z &= 38 \\ 24x + 2y + 14z &= 6 \\ 22x + 9y + -40z &= 28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + -40z &= 21 \\ 27x + -50y + 30z &= -11 \\ 25x + -39y + 18z &= 30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 36y + -22z &= 14 \\ -31x + -2y + 40z &= 48 \\ -38x + 21y + -38z &= 37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 25y + -37z &= 12 \\ -43x + 48y + 47z &= -2 \\ 2x + 36y + -29z &= 12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 18y + 16z &= -35 \\ -26x + 13y + 33z &= -11 \\ 32x + 43y + 21z &= -4 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -25y + 37z &= 14 \\ -39x + 36y + 38z &= -10 \\ -28x + -12y + 1z &= -30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 1y + 31z &= 4 \\ -21x + 34y + -43z &= -29 \\ -21x + 41y + -35z &= 2 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -30y + -27z &= -31 \\ -21x + 10y + -24z &= 23 \\ 42x + -37y + -22z &= 39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 6y + -2z & = 48 \\ -4x + 38y + 3z & = 30 \\ -21x + -7y + 27z & = -12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -46y + 2z & = -43 \\ -7x + -27y + -36z & = 2 \\ 22x + -37y + 26z & = 13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 48y + 18z & = -40 \\ 3x + -35y + 6z & = 4 \\ -33x + -50y + 36z & = -27 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 40y + -36z & = 7 \\ 26x + 12y + -9z & = -32 \\ 5x + 34y + 49z & = 29 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -10y + 18z & = 6 \\ 31x + -22y + -38z & = -1 \\ -15x + -2y + 45z & = -28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 22y + -18z & = 8 \\ 4x + 7y + -43z & = 46 \\ 39x + 16y + -14z & = -46 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -39y + -41z & = 50 \\ 28x + 36y + 38z & = 18 \\ 29x + -46y + -45z & = 12 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 36y + -4z & = -34 \\ -36x + 7y + 30z & = 29 \\ -10x + -16y + 44z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 33y + -4z & = 39 \\ 39x + 42y + 17z & = -2 \\ -16x + -36y + -13z & = -49 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 50y + 47z & = -21 \\ -46x + 40y + 42z & = 34 \\ -12x + 25y + -32z & = 42 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 42y + 4z & = 40 \\ -5x + 50y + -28z & = 29 \\ -36x + -31y + 18z & = 16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 26y + 20z & = 41 \\ 6x + 11y + 23z & = -30 \\ -27x + 46y + -7z & = -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 16y + 42z & = -29 \\ -29x + 33y + -19z & = -27 \\ -50x + 17y + 39z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -31y + -40z & = 49 \\ -27x + -22y + -27z & = -29 \\ 17x + 8y + 8z & = -31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 49y + -18z & = -9 \\ -39x + -13y + 6z & = -1 \\ -23x + -26y + -4z & = 47 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 50y + 11z & = 20 \\ -50x + -41y + 26z & = 1 \\ -30x + -2y + 1z & = -24 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 5y + -15z & = -30 \\ -23x + 36y + -36z & = 46 \\ -24x + 15y + -44z & = 13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 33y + 8z & = 37 \\ -45x + 23y + -43z & = 5 \\ 18x + 33y + -40z & = -50 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -5y + -31z &= 21 \\ -42x + -42y + 40z &= 41 \\ 30x + -48y + 35z &= -13 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 1y + 20z &= -46 \\ 49x + 12y + 5z &= 7 \\ 28x + 34y + 8z &= -25 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 24y + -7z &= 2 \\ 47x + 29y + 23z &= -50 \\ 30x + 39y + -37z &= -40 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -39y + -46z &= 30 \\ 44x + -40y + 43z &= 44 \\ 30x + -5y + 14z &= 45 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -15y + 44z &= -45 \\ 46x + -30y + 35z &= 22 \\ 25x + 31y + -19z &= -16 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -32y + 48z &= 50 \\ 6x + 18y + 2z &= -26 \\ -12x + -28y + 10z &= 43 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + -28z &= -6 \\ -11x + 43y + 20z &= -26 \\ 9x + 21y + 50z &= 37 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 32y + -21z &= -39 \\ -18x + -49y + 14z &= 29 \\ -41x + -50y + -36z &= 35 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -21y + 50z &= 3 \\ -31x + -36y + -18z &= 26 \\ 37x + 37y + 45z &= 34 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -22y + 49z &= 47 \\ -1x + 47y + 45z &= -16 \\ -22x + -11y + -7z &= 9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 35y + -39z &= 33 \\ 18x + 12y + -29z &= -37 \\ 31x + -28y + 17z &= 31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 44y + -44z &= 38 \\ -27x + -36y + 43z &= 3 \\ -14x + -35y + 48z &= 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 38y + -2z & = 45 \\ -35x + 49y + -16z & = -41 \\ 33x + 27y + -34z & = 8 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 30y + 40z & = -35 \\ -5x + -35y + 29z & = 33 \\ -19x + -48y + 47z & = 7 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 13y + 14z & = -35 \\ 12x + 23y + -7z & = 35 \\ 11x + 6y + -30z & = 43 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -39y + 31z & = 25 \\ 16x + -9y + 19z & = 12 \\ 26x + 24y + 34z & = 31 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 17y + -7z & = 35 \\ 16x + -33y + -26z & = -9 \\ -36x + -30y + 11z & = -3 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 40y + 36z & = 20 \\ 46x + -13y + -35z & = 50 \\ 15x + 41y + 9z & = -35 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -5y + -16z & = -4 \\ -5x + 18y + 35z & = 33 \\ 39x + 46y + -20z & = -30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -50y + -41z & = 18 \\ 19x + -36y + 4z & = -11 \\ 10x + 6y + 17z & = 9 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 36y + -27z & = -37 \\ 15x + 12y + 43z & = 20 \\ -22x + -36y + 43z & = -28 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 7y + 34z & = -23 \\ -8x + 46y + 20z & = -20 \\ 42x + -38y + -50z & = -15 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 11y + -31z & = 15 \\ -15x + -23y + -16z & = 22 \\ -39x + 25y + 23z & = -39 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -15y + 46z & = 39 \\ 19x + 8y + -15z & = 7 \\ -15x + -15y + -22z & = 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + -20y + 6z & = -45 \\ 27x + 43y + -43z & = 4 \\ 24x + -33y + -28z & = -30 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 12y + 13z & = 14 \\ -19x + -22y + -47z & = -26 \\ -42x + 29y + 30z & = 1 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 40y + 7z & = -23 \\ -5x + -2y + 10z & = 37 \\ -5x + 37y + 10z & = -6 \end{cases}$$

Solve the following system:

$$\begin{cases} -27x + 50y + -7z & = -22 \\ -21x + 19y + 4z & = 35 \\ -4x + -14y + 28z & = 3 \end{cases}$$

4 Two Times Two Linear Systems

Solve the following system:

$$\begin{cases} 3x + 12y & = -17 \\ -10x + -11y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -17 & 12 \\ 10 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -10 & -11 \end{vmatrix}} = \frac{67}{87}$$

$$y = \frac{\begin{vmatrix} 3 & -17 \\ -10 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -10 & -11 \end{vmatrix}} = \frac{-140}{87}$$

Solve the following system:

$$\begin{cases} 3x + -16y &= -20 \\ -18x + 2y &= 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & -16 \\ 2 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -18 & 2 \end{vmatrix}} = \frac{-8}{-282}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ -18 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -18 & 2 \end{vmatrix}} = \frac{-354}{-282}$$

Solve the following system:

$$\begin{cases} 3x + -15y &= 0 \\ 20x + -20y &= -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & -15 \\ -9 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 20 & -20 \end{vmatrix}} = \frac{-135}{240}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ 20 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 20 & -20 \end{vmatrix}} = \frac{-27}{240}$$

Solve the following system:

$$\begin{cases} 3x + 15y &= -16 \\ 7x + 4y &= 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 15 \\ 19 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ 7 & 4 \end{vmatrix}} = \frac{-349}{-93}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ 7 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ 7 & 4 \end{vmatrix}} = \frac{169}{-93}$$

Solve the following system:

$$\begin{cases} 3x + -1y &= 10 \\ 13x + 1y &= 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & -1 \\ 20 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 13 & 1 \end{vmatrix}} = \frac{30}{16}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ 13 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 13 & 1 \end{vmatrix}} = \frac{-70}{16}$$

Solve the following system:

$$\begin{cases} 3x + -15y &= -8 \\ 14x + 17y &= 4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & -15 \\ 4 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 14 & 17 \end{vmatrix}} = \frac{-76}{261}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 14 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 14 & 17 \end{vmatrix}} = \frac{124}{261}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= 7 \\ -18x + -5y &= -17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & -10 \\ -17 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -18 & -5 \end{vmatrix}} = \frac{-205}{-195}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -18 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -18 & -5 \end{vmatrix}} = \frac{75}{-195}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = -20 \\ 11x + -6y & = -17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & -9 \\ -17 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 11 & -6 \end{vmatrix}} = \frac{-33}{81}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ 11 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 11 & -6 \end{vmatrix}} = \frac{169}{81}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = 14 \\ 18x + -7y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 14 & -10 \\ 20 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 18 & -7 \end{vmatrix}} = \frac{102}{159}$$

$$y = \frac{\begin{vmatrix} 3 & 14 \\ 18 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 18 & -7 \end{vmatrix}} = \frac{-192}{159}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = -16 \\ 16x + -8y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 9 \\ -11 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 16 & -8 \end{vmatrix}} = \frac{227}{-168}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ 16 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 16 & -8 \end{vmatrix}} = \frac{223}{-168}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -5 \\ 9x + 16y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -5 & 8 \\ 14 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 9 & 16 \end{vmatrix}} = \frac{-192}{-24}$$

$$y = \frac{\begin{vmatrix} 3 & -5 \\ 9 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 9 & 16 \end{vmatrix}} = \frac{87}{-24}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = -10 \\ 8x + -6y & = 0 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & 2 \\ 0 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 8 & -6 \end{vmatrix}} = \frac{60}{-34}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ 8 & 0 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 8 & -6 \end{vmatrix}} = \frac{80}{-34}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = 15 \\ -14x + 1y & = -6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & 3 \\ -6 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -14 & 1 \end{vmatrix}} = \frac{33}{45}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -14 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -14 & 1 \end{vmatrix}} = \frac{192}{45}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = 18 \\ -6x + -13y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & 14 \\ 14 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -6 & -13 \end{vmatrix}} = \frac{-430}{45}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -6 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -6 & -13 \end{vmatrix}} = \frac{150}{45}$$

Solve the following system:

$$\begin{cases} 3x + -8y & = 7 \\ 18x + -6y & = -12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & -8 \\ -12 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ 18 & -6 \end{vmatrix}} = \frac{-138}{126}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ 18 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ 18 & -6 \end{vmatrix}} = \frac{-162}{126}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = 11 \\ 15x + -14y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & -5 \\ 20 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 15 & -14 \end{vmatrix}} = \frac{-54}{33}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ 15 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 15 & -14 \end{vmatrix}} = \frac{-105}{33}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = 15 \\ -17x + 4y & = -17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -3 \\ -17 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -17 & 4 \end{vmatrix}} = \frac{9}{-39}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -17 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -17 & 4 \end{vmatrix}} = \frac{204}{-39}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = 1 \\ -16x + 5y & = -19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 1 & 8 \\ -19 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -16 & 5 \end{vmatrix}} = \frac{157}{143}$$

$$y = \frac{\begin{vmatrix} 3 & 1 \\ -16 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -16 & 5 \end{vmatrix}} = \frac{-41}{143}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = -16 \\ -2x + -7y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & -10 \\ 16 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -2 & -7 \end{vmatrix}} = \frac{272}{-41}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ -2 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -2 & -7 \end{vmatrix}} = \frac{16}{-41}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = -12 \\ 5x + -9y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & 14 \\ 1 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 5 & -9 \end{vmatrix}} = \frac{94}{-97}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 5 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 5 & -9 \end{vmatrix}} = \frac{63}{-97}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = 2 \\ 2x + 7y & = 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 2 & 2 \\ 2 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 2 & 7 \end{vmatrix}} = \frac{10}{17}$$

$$y = \frac{\begin{vmatrix} 3 & 2 \\ 2 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 2 & 7 \end{vmatrix}} = \frac{2}{17}$$

Solve the following system:

$$\begin{cases} 3x + -18y & = 20 \\ 8x + 13y & = -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & -18 \\ -20 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ 8 & 13 \end{vmatrix}} = \frac{-100}{183}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ 8 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ 8 & 13 \end{vmatrix}} = \frac{-220}{183}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = -18 \\ -6x + 18y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -18 & 12 \\ 11 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -6 & 18 \end{vmatrix}} = \frac{-456}{126}$$

$$y = \frac{\begin{vmatrix} 3 & -18 \\ -6 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -6 & 18 \end{vmatrix}} = \frac{-75}{126}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = -2 \\ -15x + -2y & = -6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & 3 \\ -6 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -15 & -2 \end{vmatrix}} = \frac{22}{39}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -15 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -15 & -2 \end{vmatrix}} = \frac{-48}{39}$$

Solve the following system:

$$\begin{cases} 3x + 18y & = -11 \\ 11x + 14y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & 18 \\ 15 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 11 & 14 \end{vmatrix}} = \frac{-424}{-156}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ 11 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 11 & 14 \end{vmatrix}} = \frac{166}{-156}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = 13 \\ -3x + -6y & = -13 \end{cases}$$

Cramer cannot work here.

Solve the following system:

$$\begin{cases} 3x + -1y & = 6 \\ -5x + 3y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -1 \\ 15 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -5 & 3 \end{vmatrix}} = \frac{33}{4}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -5 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -5 & 3 \end{vmatrix}} = \frac{75}{4}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= -1 \\ 3x + 11y &= 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -19 \\ 3 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 3 & 11 \end{vmatrix}} = \frac{46}{90}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 3 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 3 & 11 \end{vmatrix}} = \frac{12}{90}$$

Solve the following system:

$$\begin{cases} 3x + 14y &= -13 \\ 15x + 12y &= -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 14 \\ -14 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 15 & 12 \end{vmatrix}} = \frac{40}{-174}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 15 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 15 & 12 \end{vmatrix}} = \frac{153}{-174}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= 20 \\ 4x + 3y &= 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & -10 \\ 19 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 4 & 3 \end{vmatrix}} = \frac{250}{49}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ 4 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 4 & 3 \end{vmatrix}} = \frac{-23}{49}$$

Solve the following system:

$$\begin{cases} 3x + -5y &= 1 \\ -4x + -2y &= -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 1 & -5 \\ -7 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -4 & -2 \end{vmatrix}} = \frac{-37}{-26}$$

$$y = \frac{\begin{vmatrix} 3 & 1 \\ -4 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -4 & -2 \end{vmatrix}} = \frac{-17}{-26}$$

Solve the following system:

$$\begin{cases} 3x + -5y &= -6 \\ 6x + -2y &= 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -6 & -5 \\ 8 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 6 & -2 \end{vmatrix}} = \frac{52}{24}$$

$$y = \frac{\begin{vmatrix} 3 & -6 \\ 6 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 6 & -2 \end{vmatrix}} = \frac{60}{24}$$

Solve the following system:

$$\begin{cases} 3x + 5y &= 18 \\ 6x + 1y &= 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & 5 \\ 14 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 6 & 1 \end{vmatrix}} = \frac{-52}{-27}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ 6 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 6 & 1 \end{vmatrix}} = \frac{-66}{-27}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = -10 \\ -18x + -18y & = -18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & -7 \\ -18 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -18 & -18 \end{vmatrix}} = \frac{54}{-180}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ -18 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -18 & -18 \end{vmatrix}} = \frac{-234}{-180}$$

Solve the following system:

$$\begin{cases} 3x + -1y & = -1 \\ -9x + 10y & = 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -1 \\ 17 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -9 & 10 \end{vmatrix}} = \frac{7}{21}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ -9 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -9 & 10 \end{vmatrix}} = \frac{42}{21}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= 19 \\ 10x + 9y &= -9 \end{cases}$$

Cramer cannot work here.

Solve the following system:

$$\begin{cases} 3x + -20y &= 2 \\ 20x + 10y &= 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 2 & -20 \\ 17 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 20 & 10 \end{vmatrix}} = \frac{360}{430}$$

$$y = \frac{\begin{vmatrix} 3 & 2 \\ 20 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 20 & 10 \end{vmatrix}} = \frac{11}{430}$$

Solve the following system:

$$\begin{cases} 3x + 20y &= -15 \\ -11x + -18y &= 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & 20 \\ 9 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ -11 & -18 \end{vmatrix}} = \frac{90}{166}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -11 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ -11 & -18 \end{vmatrix}} = \frac{-138}{166}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = -2 \\ -15x + 4y & = -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -3 \\ -20 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -15 & 4 \end{vmatrix}} = \frac{-68}{-33}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -15 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -15 & 4 \end{vmatrix}} = \frac{-90}{-33}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = -12 \\ 6x + -8y & = 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -10 \\ 2 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 6 & -8 \end{vmatrix}} = \frac{116}{36}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 6 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 6 & -8 \end{vmatrix}} = \frac{78}{36}$$

Solve the following system:

$$\begin{cases} 3x + -18y & = -1 \\ 1x + 16y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -18 \\ 15 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ 1 & 16 \end{vmatrix}} = \frac{254}{66}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 1 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ 1 & 16 \end{vmatrix}} = \frac{46}{66}$$

Solve the following system:

$$\begin{cases} 3x + -1y & = -8 \\ 9x + 3y & = 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & -1 \\ 17 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 9 & 3 \end{vmatrix}} = \frac{-7}{18}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 9 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 9 & 3 \end{vmatrix}} = \frac{123}{18}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = 8 \\ 15x + -14y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & -9 \\ 18 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 15 & -14 \end{vmatrix}} = \frac{50}{93}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 15 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 15 & -14 \end{vmatrix}} = \frac{-66}{93}$$

Solve the following system:

$$\begin{cases} 3x + -12y & = 20 \\ 17x + 4y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & -12 \\ 6 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ 17 & 4 \end{vmatrix}} = \frac{152}{216}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ 17 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ 17 & 4 \end{vmatrix}} = \frac{-322}{216}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = -18 \\ -9x + -6y & = -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -18 & 12 \\ -2 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -9 & -6 \end{vmatrix}} = \frac{132}{90}$$

$$y = \frac{\begin{vmatrix} 3 & -18 \\ -9 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -9 & -6 \end{vmatrix}} = \frac{-168}{90}$$

Solve the following system:

$$\begin{cases} 3x + -18y & = -1 \\ 3x + -5y & = -16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -18 \\ -16 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ 3 & -5 \end{vmatrix}} = \frac{-283}{39}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 3 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ 3 & -5 \end{vmatrix}} = \frac{-45}{39}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = 8 \\ 10x + 13y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & 17 \\ 12 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 10 & 13 \end{vmatrix}} = \frac{-100}{-131}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 10 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 10 & 13 \end{vmatrix}} = \frac{-44}{-131}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = -7 \\ -14x + 1y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & -6 \\ 13 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -14 & 1 \end{vmatrix}} = \frac{71}{-81}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ -14 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -14 & 1 \end{vmatrix}} = \frac{-59}{-81}$$

Solve the following system:

$$\begin{cases} 3x + -17y & = 6 \\ -6x + -7y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -17 \\ 18 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -6 & -7 \end{vmatrix}} = \frac{264}{-123}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -6 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -6 & -7 \end{vmatrix}} = \frac{90}{-123}$$

Solve the following system:

$$\begin{cases} 3x + 4y & = 19 \\ 12x + -8y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 19 & 4 \\ 14 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 12 & -8 \end{vmatrix}} = \frac{-208}{-72}$$

$$y = \frac{\begin{vmatrix} 3 & 19 \\ 12 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 12 & -8 \end{vmatrix}} = \frac{-186}{-72}$$

Solve the following system:

$$\begin{cases} 3x + -1y & = -14 \\ 8x + -9y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -14 & -1 \\ 18 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 8 & -9 \end{vmatrix}} = \frac{144}{-19}$$

$$y = \frac{\begin{vmatrix} 3 & -14 \\ 8 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 8 & -9 \end{vmatrix}} = \frac{166}{-19}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = -19 \\ -17x + -12y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & -7 \\ 18 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -17 & -12 \end{vmatrix}} = \frac{354}{-155}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ -17 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -17 & -12 \end{vmatrix}} = \frac{-269}{-155}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = -16 \\ -14x + -17y & = -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 9 \\ -1 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -14 & -17 \end{vmatrix}} = \frac{281}{75}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ -14 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -14 & -17 \end{vmatrix}} = \frac{-227}{75}$$

Solve the following system:

$$\begin{cases} 3x + -15y & = 4 \\ -16x + -16y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & -15 \\ 1 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -16 & -16 \end{vmatrix}} = \frac{-49}{-288}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ -16 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -16 & -16 \end{vmatrix}} = \frac{67}{-288}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = 16 \\ -10x + 9y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 16 & -5 \\ 6 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -10 & 9 \end{vmatrix}} = \frac{174}{-23}$$

$$y = \frac{\begin{vmatrix} 3 & 16 \\ -10 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -10 & 9 \end{vmatrix}} = \frac{178}{-23}$$

Solve the following system:

$$\begin{cases} 3x + 13y & = -19 \\ 16x + 17y & = -12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & 13 \\ -12 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 16 & 17 \end{vmatrix}} = \frac{-167}{-157}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ 16 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 16 & 17 \end{vmatrix}} = \frac{268}{-157}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = -14 \\ -5x + -10y & = -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -14 & 5 \\ -13 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -5 & -10 \end{vmatrix}} = \frac{205}{-5}$$

$$y = \frac{\begin{vmatrix} 3 & -14 \\ -5 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -5 & -10 \end{vmatrix}} = \frac{-109}{-5}$$

Solve the following system:

$$\begin{cases} 3x + 13y & = -19 \\ 16x + -11y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & 13 \\ 13 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 16 & -11 \end{vmatrix}} = \frac{40}{-241}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ 16 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 16 & -11 \end{vmatrix}} = \frac{343}{-241}$$

Solve the following system:

$$\begin{cases} 3x + 20y & = -15 \\ -20x + 3y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & 20 \\ 10 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ -20 & 3 \end{vmatrix}} = \frac{-245}{409}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -20 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ -20 & 3 \end{vmatrix}} = \frac{-270}{409}$$

Solve the following system:

$$\begin{cases} 3x + -11y & = 8 \\ 1x + 5y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & -11 \\ 11 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ 1 & 5 \end{vmatrix}} = \frac{161}{26}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 1 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ 1 & 5 \end{vmatrix}} = \frac{25}{26}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = 18 \\ -16x + 11y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & -5 \\ -9 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -16 & 11 \end{vmatrix}} = \frac{153}{-47}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -16 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -16 & 11 \end{vmatrix}} = \frac{261}{-47}$$

Solve the following system:

$$\begin{cases} 3x + -1y & = -13 \\ -4x + 10y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & -1 \\ 16 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -4 & 10 \end{vmatrix}} = \frac{-114}{26}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ -4 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -4 & 10 \end{vmatrix}} = \frac{-4}{26}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = 13 \\ 16x + -15y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & -6 \\ 15 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 16 & -15 \end{vmatrix}} = \frac{-105}{51}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ 16 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 16 & -15 \end{vmatrix}} = \frac{-163}{51}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = -15 \\ -4x + -15y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & 1 \\ -9 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -4 & -15 \end{vmatrix}} = \frac{234}{-41}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -4 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -4 & -15 \end{vmatrix}} = \frac{-87}{-41}$$

Solve the following system:

$$\begin{cases} 3x + 18y & = 20 \\ -20x + -3y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & 18 \\ 13 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -20 & -3 \end{vmatrix}} = \frac{-294}{351}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ -20 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -20 & -3 \end{vmatrix}} = \frac{439}{351}$$

Solve the following system:

$$\begin{cases} 3x + 4y & = 6 \\ -6x + -2y & = -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & 4 \\ -4 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ -6 & -2 \end{vmatrix}} = \frac{4}{18}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -6 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ -6 & -2 \end{vmatrix}} = \frac{24}{18}$$

Solve the following system:

$$\begin{cases} 3x + 18y & = 20 \\ -4x + -11y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & 18 \\ -9 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -4 & -11 \end{vmatrix}} = \frac{-58}{39}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ -4 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -4 & -11 \end{vmatrix}} = \frac{53}{39}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = 14 \\ -20x + -3y & = -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 14 & 2 \\ -2 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -20 & -3 \end{vmatrix}} = \frac{-38}{31}$$

$$y = \frac{\begin{vmatrix} 3 & 14 \\ -20 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -20 & -3 \end{vmatrix}} = \frac{274}{31}$$

Solve the following system:

$$\begin{cases} 3x + 7y & = 17 \\ 10x + -9y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & 7 \\ -14 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ 10 & -9 \end{vmatrix}} = \frac{-55}{-97}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 10 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ 10 & -9 \end{vmatrix}} = \frac{-212}{-97}$$

Solve the following system:

$$\begin{cases} 3x + -4y & = -7 \\ 9x + -17y & = 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & -4 \\ 19 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 9 & -17 \end{vmatrix}} = \frac{195}{-15}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ 9 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 9 & -17 \end{vmatrix}} = \frac{120}{-15}$$

Solve the following system:

$$\begin{cases} 3x + -13y &= 20 \\ -20x + 9y &= 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & -13 \\ 2 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ -20 & 9 \end{vmatrix}} = \frac{206}{-233}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ -20 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ -20 & 9 \end{vmatrix}} = \frac{406}{-233}$$

Solve the following system:

$$\begin{cases} 3x + 19y &= 18 \\ 19x + 2y &= -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & 19 \\ -1 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 19 & 2 \end{vmatrix}} = \frac{55}{-355}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ 19 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 19 & 2 \end{vmatrix}} = \frac{-345}{-355}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = 7 \\ 9x + -15y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 5 \\ -14 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 9 & -15 \end{vmatrix}} = \frac{-35}{-90}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ 9 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 9 & -15 \end{vmatrix}} = \frac{-105}{-90}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = 17 \\ 8x + 20y & = -15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & 3 \\ -15 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 8 & 20 \end{vmatrix}} = \frac{385}{36}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 8 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 8 & 20 \end{vmatrix}} = \frac{-181}{36}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = 16 \\ 20x + -4y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 16 & 12 \\ 15 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 20 & -4 \end{vmatrix}} = \frac{-244}{-252}$$

$$y = \frac{\begin{vmatrix} 3 & 16 \\ 20 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 20 & -4 \end{vmatrix}} = \frac{-275}{-252}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = -8 \\ 16x + -6y & = -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & -19 \\ -1 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 16 & -6 \end{vmatrix}} = \frac{29}{286}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 16 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 16 & -6 \end{vmatrix}} = \frac{125}{286}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = -11 \\ -3x + -2y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & -19 \\ 12 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -3 & -2 \end{vmatrix}} = \frac{250}{-63}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ -3 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -3 & -2 \end{vmatrix}} = \frac{3}{-63}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = 13 \\ -15x + 13y & = 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & 14 \\ 5 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -15 & 13 \end{vmatrix}} = \frac{99}{249}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ -15 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -15 & 13 \end{vmatrix}} = \frac{210}{249}$$

Solve the following system:

$$\begin{cases} 3x + -18y &= 18 \\ -2x + 9y &= 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & -18 \\ 2 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ -2 & 9 \end{vmatrix}} = \frac{198}{-9}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -2 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ -2 & 9 \end{vmatrix}} = \frac{42}{-9}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= -20 \\ 2x + -4y &= 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & -10 \\ 3 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 2 & -4 \end{vmatrix}} = \frac{110}{8}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ 2 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 2 & -4 \end{vmatrix}} = \frac{49}{8}$$

Solve the following system:

$$\begin{cases} 3x + -8y & = -1 \\ -7x + -4y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -8 \\ 9 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ -7 & -4 \end{vmatrix}} = \frac{76}{-68}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ -7 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ -7 & -4 \end{vmatrix}} = \frac{20}{-68}$$

Solve the following system:

$$\begin{cases} 3x + -1y & = 19 \\ -20x + -8y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 19 & -1 \\ 16 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -20 & -8 \end{vmatrix}} = \frac{-136}{-44}$$

$$y = \frac{\begin{vmatrix} 3 & 19 \\ -20 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -20 & -8 \end{vmatrix}} = \frac{428}{-44}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = 4 \\ 18x + -9y & = -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & 17 \\ -20 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 18 & -9 \end{vmatrix}} = \frac{304}{-333}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ 18 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 18 & -9 \end{vmatrix}} = \frac{-132}{-333}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = 11 \\ -15x + -10y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & 12 \\ 6 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -15 & -10 \end{vmatrix}} = \frac{-182}{150}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ -15 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -15 & -10 \end{vmatrix}} = \frac{183}{150}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = 5 \\ -4x + 4y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & 2 \\ -11 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -4 & 4 \end{vmatrix}} = \frac{42}{20}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -4 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -4 & 4 \end{vmatrix}} = \frac{-13}{20}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = 16 \\ 11x + -8y & = -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 16 & 8 \\ -1 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 11 & -8 \end{vmatrix}} = \frac{-120}{-112}$$

$$y = \frac{\begin{vmatrix} 3 & 16 \\ 11 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 11 & -8 \end{vmatrix}} = \frac{-179}{-112}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = -4 \\ -6x + 7y & = 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 17 \\ 19 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ -6 & 7 \end{vmatrix}} = \frac{-351}{123}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -6 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ -6 & 7 \end{vmatrix}} = \frac{33}{123}$$

Solve the following system:

$$\begin{cases} 3x + 19y & = 2 \\ -16x + -4y & = 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 2 & 19 \\ 3 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -16 & -4 \end{vmatrix}} = \frac{-65}{292}$$

$$y = \frac{\begin{vmatrix} 3 & 2 \\ -16 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -16 & -4 \end{vmatrix}} = \frac{41}{292}$$

Solve the following system:

$$\begin{cases} 3x + -8y & = -15 \\ 7x + 3y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & -8 \\ 14 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ 7 & 3 \end{vmatrix}} = \frac{67}{65}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ 7 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ 7 & 3 \end{vmatrix}} = \frac{147}{65}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = 0 \\ -19x + 5y & = -12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & -10 \\ -12 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -19 & 5 \end{vmatrix}} = \frac{-120}{-175}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ -19 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -19 & 5 \end{vmatrix}} = \frac{-36}{-175}$$

Solve the following system:

$$\begin{cases} 3x + -4y & = 11 \\ 9x + -20y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & -4 \\ 13 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 9 & -20 \end{vmatrix}} = \frac{-168}{-24}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ 9 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 9 & -20 \end{vmatrix}} = \frac{-60}{-24}$$

Explain why does the following system has not a unique solution:

$$\begin{cases} 3x + -4y & = 7 \\ -3x + 4y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & -4 \\ 14 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ -3 & 4 \end{vmatrix}} = \frac{84}{0}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -3 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ -3 & 4 \end{vmatrix}} = \frac{63}{0}$$

Solve the following system:

$$\begin{cases} 3x + -1y &= -15 \\ -4x + 1y &= -10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & -1 \\ -10 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -4 & 1 \end{vmatrix}} = \frac{-25}{-1}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -4 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -4 & 1 \end{vmatrix}} = \frac{-90}{-1}$$

Solve the following system:

$$\begin{cases} 3x + -15y &= 13 \\ -5x + 4y &= 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & -15 \\ 1 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -5 & 4 \end{vmatrix}} = \frac{67}{-63}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ -5 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -5 & 4 \end{vmatrix}} = \frac{68}{-63}$$

Solve the following system:

$$\begin{cases} 3x + 18y & = 17 \\ -12x + 8y & = -17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & 18 \\ -17 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -12 & 8 \end{vmatrix}} = \frac{442}{240}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ -12 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -12 & 8 \end{vmatrix}} = \frac{153}{240}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = 16 \\ -3x + 12y & = -15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 16 & 5 \\ -15 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -3 & 12 \end{vmatrix}} = \frac{267}{51}$$

$$y = \frac{\begin{vmatrix} 3 & 16 \\ -3 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -3 & 12 \end{vmatrix}} = \frac{3}{51}$$

Solve the following system:

$$\begin{cases} 3x + -13y & = 10 \\ 4x + 20y & = -16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & -13 \\ -16 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ 4 & 20 \end{vmatrix}} = \frac{-8}{112}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ 4 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ 4 & 20 \end{vmatrix}} = \frac{-88}{112}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = -7 \\ -6x + 18y & = 0 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & 3 \\ 0 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -6 & 18 \end{vmatrix}} = \frac{-126}{72}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ -6 & 0 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -6 & 18 \end{vmatrix}} = \frac{-42}{72}$$

Solve the following system:

$$\begin{cases} 3x + 13y &= -8 \\ 16x + 4y &= 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 13 \\ 15 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 16 & 4 \end{vmatrix}} = \frac{-227}{-196}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 16 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 16 & 4 \end{vmatrix}} = \frac{173}{-196}$$

Solve the following system:

$$\begin{cases} 3x + 11y &= 18 \\ -3x + -1y &= 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & 11 \\ 9 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -3 & -1 \end{vmatrix}} = \frac{-117}{30}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -3 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -3 & -1 \end{vmatrix}} = \frac{81}{30}$$

Solve the following system:

$$\begin{cases} 3x + -12y & = 10 \\ -14x + -14y & = -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & -12 \\ -2 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -14 & -14 \end{vmatrix}} = \frac{-164}{-210}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ -14 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -14 & -14 \end{vmatrix}} = \frac{134}{-210}$$

Solve the following system:

$$\begin{cases} 3x + 10y & = 7 \\ -20x + -4y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 10 \\ 1 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 10 \\ -20 & -4 \end{vmatrix}} = \frac{-38}{188}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -20 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 10 \\ -20 & -4 \end{vmatrix}} = \frac{143}{188}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = -13 \\ 15x + -15y & = -8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 5 \\ -8 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 15 & -15 \end{vmatrix}} = \frac{235}{-120}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 15 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 15 & -15 \end{vmatrix}} = \frac{171}{-120}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = 3 \\ 1x + 8y & = -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 3 & -6 \\ -20 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 1 & 8 \end{vmatrix}} = \frac{-96}{30}$$

$$y = \frac{\begin{vmatrix} 3 & 3 \\ 1 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 1 & 8 \end{vmatrix}} = \frac{-63}{30}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = 4 \\ -1x + -3y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & 8 \\ -9 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -1 & -3 \end{vmatrix}} = \frac{60}{-1}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ -1 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -1 & -3 \end{vmatrix}} = \frac{-23}{-1}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = -19 \\ -8x + -7y & = -8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & 5 \\ -8 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -8 & -7 \end{vmatrix}} = \frac{173}{19}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ -8 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -8 & -7 \end{vmatrix}} = \frac{-176}{19}$$

Solve the following system:

$$\begin{cases} 3x + -17y &= -14 \\ -9x + 6y &= 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -14 & -17 \\ 9 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -9 & 6 \end{vmatrix}} = \frac{69}{-135}$$

$$y = \frac{\begin{vmatrix} 3 & -14 \\ -9 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -9 & 6 \end{vmatrix}} = \frac{-99}{-135}$$

Solve the following system:

$$\begin{cases} 3x + -16y &= -12 \\ -13x + 11y &= 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -16 \\ 19 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -13 & 11 \end{vmatrix}} = \frac{172}{-175}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ -13 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -13 & 11 \end{vmatrix}} = \frac{-99}{-175}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = 7 \\ -2x + -10y & = 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 14 \\ 5 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -2 & -10 \end{vmatrix}} = \frac{-140}{-2}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -2 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -2 & -10 \end{vmatrix}} = \frac{29}{-2}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = 5 \\ -12x + -20y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & 1 \\ 11 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -12 & -20 \end{vmatrix}} = \frac{-111}{-48}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -12 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -12 & -20 \end{vmatrix}} = \frac{93}{-48}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = 20 \\ -20x + 16y & = -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & 5 \\ -4 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -20 & 16 \end{vmatrix}} = \frac{340}{148}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ -20 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -20 & 16 \end{vmatrix}} = \frac{388}{148}$$

Solve the following system:

$$\begin{cases} 3x + -11y & = -1 \\ 18x + -5y & = 4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -11 \\ 4 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ 18 & -5 \end{vmatrix}} = \frac{49}{183}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 18 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ 18 & -5 \end{vmatrix}} = \frac{30}{183}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = 20 \\ 1x + -11y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 20 & 17 \\ -9 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 1 & -11 \end{vmatrix}} = \frac{-67}{-50}$$

$$y = \frac{\begin{vmatrix} 3 & 20 \\ 1 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 1 & -11 \end{vmatrix}} = \frac{-47}{-50}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = 0 \\ 2x + -12y & = -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & 17 \\ -2 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 2 & -12 \end{vmatrix}} = \frac{34}{-70}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ 2 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 2 & -12 \end{vmatrix}} = \frac{-6}{-70}$$

Solve the following system:

$$\begin{cases} 3x + 16y & = -16 \\ 12x + -5y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 16 \\ 6 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 12 & -5 \end{vmatrix}} = \frac{-16}{-207}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ 12 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 12 & -5 \end{vmatrix}} = \frac{210}{-207}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = -9 \\ -14x + 7y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -9 & 2 \\ 6 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -14 & 7 \end{vmatrix}} = \frac{-75}{49}$$

$$y = \frac{\begin{vmatrix} 3 & -9 \\ -14 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -14 & 7 \end{vmatrix}} = \frac{-108}{49}$$

Solve the following system:

$$\begin{cases} 3x + -9y &= 16 \\ 3x + 16y &= -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 16 & -9 \\ -13 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 3 & 16 \end{vmatrix}} = \frac{139}{75}$$

$$y = \frac{\begin{vmatrix} 3 & 16 \\ 3 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 3 & 16 \end{vmatrix}} = \frac{-87}{75}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= 9 \\ 17x + 5y &= -15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & -19 \\ -15 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 17 & 5 \end{vmatrix}} = \frac{-240}{338}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 17 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 17 & 5 \end{vmatrix}} = \frac{-198}{338}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = -2 \\ -11x + 2y & = 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & 17 \\ 19 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ -11 & 2 \end{vmatrix}} = \frac{-327}{193}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -11 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ -11 & 2 \end{vmatrix}} = \frac{35}{193}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = -19 \\ -4x + -12y & = 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & -7 \\ 3 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -4 & -12 \end{vmatrix}} = \frac{249}{-64}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ -4 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -4 & -12 \end{vmatrix}} = \frac{-67}{-64}$$

Solve the following system:

$$\begin{cases} 3x + 4y & = -6 \\ 7x + 11y & = 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -6 & 4 \\ 5 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 7 & 11 \end{vmatrix}} = \frac{-86}{5}$$

$$y = \frac{\begin{vmatrix} 3 & -6 \\ 7 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 7 & 11 \end{vmatrix}} = \frac{57}{5}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = -5 \\ 16x + -18y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -5 & 6 \\ -3 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 16 & -18 \end{vmatrix}} = \frac{108}{-150}$$

$$y = \frac{\begin{vmatrix} 3 & -5 \\ 16 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 16 & -18 \end{vmatrix}} = \frac{71}{-150}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = 18 \\ -17x + -14y & = -5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & -3 \\ -5 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -17 & -14 \end{vmatrix}} = \frac{-267}{-93}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -17 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -17 & -14 \end{vmatrix}} = \frac{291}{-93}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = -16 \\ -16x + 5y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & -9 \\ 10 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -16 & 5 \end{vmatrix}} = \frac{10}{-129}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ -16 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -16 & 5 \end{vmatrix}} = \frac{-226}{-129}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = 6 \\ 2x + -4y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & 9 \\ 1 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 2 & -4 \end{vmatrix}} = \frac{-33}{-30}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ 2 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 2 & -4 \end{vmatrix}} = \frac{-9}{-30}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = 9 \\ 7x + 6y & = -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & 14 \\ -7 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 7 & 6 \end{vmatrix}} = \frac{152}{-80}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 7 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 7 & 6 \end{vmatrix}} = \frac{-84}{-80}$$

Solve the following system:

$$\begin{cases} 3x + -2y &= -12 \\ 8x + -7y &= -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -2 \\ -13 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 8 & -7 \end{vmatrix}} = \frac{58}{-5}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 8 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 8 & -7 \end{vmatrix}} = \frac{57}{-5}$$

Solve the following system:

$$\begin{cases} 3x + 11y &= 1 \\ -1x + -2y &= 7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 1 & 11 \\ 7 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -1 & -2 \end{vmatrix}} = \frac{-79}{5}$$

$$y = \frac{\begin{vmatrix} 3 & 1 \\ -1 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -1 & -2 \end{vmatrix}} = \frac{22}{5}$$

Solve the following system:

$$\begin{cases} 3x + -17y &= -11 \\ 2x + 11y &= 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & -17 \\ 16 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ 2 & 11 \end{vmatrix}} = \frac{151}{67}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ 2 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ 2 & 11 \end{vmatrix}} = \frac{70}{67}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= 6 \\ -19x + 16y &= 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -10 \\ 5 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -19 & 16 \end{vmatrix}} = \frac{146}{-142}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -19 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -19 & 16 \end{vmatrix}} = \frac{129}{-142}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = -2 \\ 18x + -17y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -9 \\ 6 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 18 & -17 \end{vmatrix}} = \frac{88}{111}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ 18 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 18 & -17 \end{vmatrix}} = \frac{54}{111}$$

Solve the following system:

$$\begin{cases} 3x + 7y & = 17 \\ -20x + 15y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & 7 \\ 1 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -20 & 15 \end{vmatrix}} = \frac{248}{185}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ -20 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -20 & 15 \end{vmatrix}} = \frac{343}{185}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = -8 \\ -14x + -12y & = -10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 14 \\ -10 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -14 & -12 \end{vmatrix}} = \frac{236}{160}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ -14 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -14 & -12 \end{vmatrix}} = \frac{-142}{160}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = -4 \\ -15x + 8y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 14 \\ 15 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -15 & 8 \end{vmatrix}} = \frac{-242}{234}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -15 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ -15 & 8 \end{vmatrix}} = \frac{-15}{234}$$

Solve the following system:

$$\begin{cases} 3x + 16y & = 12 \\ 5x + -14y & = -12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 12 & 16 \\ -12 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 5 & -14 \end{vmatrix}} = \frac{24}{-122}$$

$$y = \frac{\begin{vmatrix} 3 & 12 \\ 5 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 5 & -14 \end{vmatrix}} = \frac{-96}{-122}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = -20 \\ 19x + -18y & = -19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & 1 \\ -19 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ 19 & -18 \end{vmatrix}} = \frac{379}{-73}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ 19 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ 19 & -18 \end{vmatrix}} = \frac{323}{-73}$$

Solve the following system:

$$\begin{cases} 3x + -16y & = 15 \\ 15x + -20y & = 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -16 \\ 2 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 15 & -20 \end{vmatrix}} = \frac{-268}{180}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ 15 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 15 & -20 \end{vmatrix}} = \frac{-219}{180}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = -20 \\ -6x + -9y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & -10 \\ -14 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -6 & -9 \end{vmatrix}} = \frac{40}{-87}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ -6 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -6 & -9 \end{vmatrix}} = \frac{-162}{-87}$$

Solve the following system:

$$\begin{cases} 3x + -20y &= -12 \\ 8x + -15y &= 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -20 \\ 13 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 8 & -15 \end{vmatrix}} = \frac{440}{115}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 8 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 8 & -15 \end{vmatrix}} = \frac{135}{115}$$

Solve the following system:

$$\begin{cases} 3x + 13y &= -11 \\ -16x + -11y &= 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & 13 \\ 15 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ -16 & -11 \end{vmatrix}} = \frac{-74}{175}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ -16 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ -16 & -11 \end{vmatrix}} = \frac{-131}{175}$$

Solve the following system:

$$\begin{cases} 3x + -7y &= -6 \\ 10x + 3y &= 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -6 & -7 \\ 8 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 10 & 3 \end{vmatrix}} = \frac{38}{79}$$

$$y = \frac{\begin{vmatrix} 3 & -6 \\ 10 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 10 & 3 \end{vmatrix}} = \frac{84}{79}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= 6 \\ -4x + -3y &= -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -19 \\ -11 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -4 & -3 \end{vmatrix}} = \frac{-227}{-85}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -4 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -4 & -3 \end{vmatrix}} = \frac{-9}{-85}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = -15 \\ -19x + 1y & = -10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & 9 \\ -10 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -19 & 1 \end{vmatrix}} = \frac{75}{174}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -19 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -19 & 1 \end{vmatrix}} = \frac{-315}{174}$$

Solve the following system:

$$\begin{cases} 3x + -1y & = -13 \\ 8x + -10y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & -1 \\ 12 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 8 & -10 \end{vmatrix}} = \frac{142}{-22}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 8 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 8 & -10 \end{vmatrix}} = \frac{140}{-22}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = 6 \\ -15x + -15y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -9 \\ 1 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -15 & -15 \end{vmatrix}} = \frac{-81}{-180}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -15 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -15 & -15 \end{vmatrix}} = \frac{93}{-180}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = 8 \\ -17x + -5y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & 2 \\ 14 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -17 & -5 \end{vmatrix}} = \frac{-68}{19}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ -17 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -17 & -5 \end{vmatrix}} = \frac{178}{19}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = 14 \\ -2x + -18y & = 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 14 & -3 \\ 3 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -2 & -18 \end{vmatrix}} = \frac{-243}{-60}$$

$$y = \frac{\begin{vmatrix} 3 & 14 \\ -2 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -2 & -18 \end{vmatrix}} = \frac{37}{-60}$$

Solve the following system:

$$\begin{cases} 3x + -15y & = -19 \\ 5x + 20y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & -15 \\ -3 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 5 & 20 \end{vmatrix}} = \frac{-425}{135}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ 5 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 5 & 20 \end{vmatrix}} = \frac{86}{135}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = 18 \\ -16x + 3y & = 4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & 8 \\ 4 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -16 & 3 \end{vmatrix}} = \frac{22}{137}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -16 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -16 & 3 \end{vmatrix}} = \frac{300}{137}$$

Solve the following system:

$$\begin{cases} 3x + -12y & = 11 \\ -2x + -16y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & -12 \\ 10 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -2 & -16 \end{vmatrix}} = \frac{-56}{-72}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ -2 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -2 & -16 \end{vmatrix}} = \frac{52}{-72}$$

Solve the following system:

$$\begin{cases} 3x + -20y &= 15 \\ 8x + -17y &= 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -20 \\ 18 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 8 & -17 \end{vmatrix}} = \frac{105}{109}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ 8 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 8 & -17 \end{vmatrix}} = \frac{-66}{109}$$

Solve the following system:

$$\begin{cases} 3x + 1y &= 18 \\ 9x + 1y &= -12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & 1 \\ -12 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ 9 & 1 \end{vmatrix}} = \frac{30}{-6}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ 9 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ 9 & 1 \end{vmatrix}} = \frac{-198}{-6}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= 17 \\ 1x + -11y &= 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & -19 \\ 1 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 1 & -11 \end{vmatrix}} = \frac{-168}{-14}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 1 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 1 & -11 \end{vmatrix}} = \frac{-14}{-14}$$

Solve the following system:

$$\begin{cases} 3x + -7y &= 13 \\ 14x + -1y &= -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & -7 \\ -14 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 14 & -1 \end{vmatrix}} = \frac{-111}{95}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ 14 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 14 & -1 \end{vmatrix}} = \frac{-224}{95}$$

Solve the following system:

$$\begin{cases} 3x + -4y & = 9 \\ 11x + -1y & = 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & -4 \\ 17 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 11 & -1 \end{vmatrix}} = \frac{59}{41}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 11 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 11 & -1 \end{vmatrix}} = \frac{-48}{41}$$

Solve the following system:

$$\begin{cases} 3x + 19y & = 11 \\ 20x + 13y & = 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & 19 \\ 5 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 20 & 13 \end{vmatrix}} = \frac{48}{-341}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ 20 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 20 & 13 \end{vmatrix}} = \frac{-205}{-341}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = 15 \\ -18x + 16y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & 8 \\ 13 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -18 & 16 \end{vmatrix}} = \frac{136}{192}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -18 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -18 & 16 \end{vmatrix}} = \frac{309}{192}$$

Solve the following system:

$$\begin{cases} 3x + 11y & = -8 \\ -18x + -12y & = -17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 11 \\ -17 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -18 & -12 \end{vmatrix}} = \frac{283}{162}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ -18 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -18 & -12 \end{vmatrix}} = \frac{-195}{162}$$

Solve the following system:

$$\begin{cases} 3x + 18y &= -13 \\ 7x + 11y &= -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 18 \\ -2 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 7 & 11 \end{vmatrix}} = \frac{-107}{-93}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 7 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 7 & 11 \end{vmatrix}} = \frac{85}{-93}$$

Solve the following system:

$$\begin{cases} 3x + 15y &= 8 \\ 3x + 13y &= 7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & 15 \\ 7 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ 3 & 13 \end{vmatrix}} = \frac{-1}{-6}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 3 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ 3 & 13 \end{vmatrix}} = \frac{-3}{-6}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -11 \\ 10x + -13y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & 8 \\ 6 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 10 & -13 \end{vmatrix}} = \frac{95}{-119}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ 10 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 10 & -13 \end{vmatrix}} = \frac{128}{-119}$$

Solve the following system:

$$\begin{cases} 3x + 18y & = -7 \\ -14x + -7y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & 18 \\ 9 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -14 & -7 \end{vmatrix}} = \frac{-113}{231}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ -14 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ -14 & -7 \end{vmatrix}} = \frac{-71}{231}$$

Solve the following system:

$$\begin{cases} 3x + -4y & = 8 \\ 11x + -3y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & -4 \\ 9 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 11 & -3 \end{vmatrix}} = \frac{12}{35}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 11 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 11 & -3 \end{vmatrix}} = \frac{-61}{35}$$

Solve the following system:

$$\begin{cases} 3x + -16y & = 11 \\ 18x + -17y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & -16 \\ 9 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 18 & -17 \end{vmatrix}} = \frac{-43}{237}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ 18 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 18 & -17 \end{vmatrix}} = \frac{-171}{237}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -13 \\ 5x + -6y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 8 \\ 13 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 5 & -6 \end{vmatrix}} = \frac{-26}{-58}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 5 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 5 & -6 \end{vmatrix}} = \frac{104}{-58}$$

Solve the following system:

$$\begin{cases} 3x + 15y & = 7 \\ -16x + -9y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 15 \\ -11 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ -16 & -9 \end{vmatrix}} = \frac{102}{213}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -16 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ -16 & -9 \end{vmatrix}} = \frac{79}{213}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = -19 \\ 11x + 14y & = -8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & 3 \\ -8 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 11 & 14 \end{vmatrix}} = \frac{-242}{9}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ 11 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 11 & 14 \end{vmatrix}} = \frac{185}{9}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = -10 \\ 5x + -17y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & -19 \\ 13 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 5 & -17 \end{vmatrix}} = \frac{417}{44}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ 5 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 5 & -17 \end{vmatrix}} = \frac{89}{44}$$

Solve the following system:

$$\begin{cases} 3x + 16y & = -10 \\ 17x + -9y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & 16 \\ -3 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 17 & -9 \end{vmatrix}} = \frac{138}{-299}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ 17 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 17 & -9 \end{vmatrix}} = \frac{161}{-299}$$

Solve the following system:

$$\begin{cases} 3x + -12y & = -1 \\ -10x + -8y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -12 \\ 20 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -10 & -8 \end{vmatrix}} = \frac{248}{-144}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ -10 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -10 & -8 \end{vmatrix}} = \frac{50}{-144}$$

Solve the following system:

$$\begin{cases} 3x + 11y & = -8 \\ 16x + 16y & = -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 11 \\ -13 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ 16 & 16 \end{vmatrix}} = \frac{15}{-128}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 16 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ 16 & 16 \end{vmatrix}} = \frac{89}{-128}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = -12 \\ 5x + 4y & = -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -19 \\ -13 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 5 & 4 \end{vmatrix}} = \frac{-295}{107}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 5 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ 5 & 4 \end{vmatrix}} = \frac{21}{107}$$

Solve the following system:

$$\begin{cases} 3x + -15y & = -10 \\ 4x + 15y & = 6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & -15 \\ 6 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 4 & 15 \end{vmatrix}} = \frac{-60}{105}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ 4 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 4 & 15 \end{vmatrix}} = \frac{58}{105}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = -4 \\ 14x + -3y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & -6 \\ 1 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 14 & -3 \end{vmatrix}} = \frac{18}{75}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ 14 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 14 & -3 \end{vmatrix}} = \frac{59}{75}$$

Solve the following system:

$$\begin{cases} 3x + -20y & = 5 \\ -20x + 19y & = -19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & -20 \\ -19 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ -20 & 19 \end{vmatrix}} = \frac{-285}{-343}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -20 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ -20 & 19 \end{vmatrix}} = \frac{43}{-343}$$

Solve the following system:

$$\begin{cases} 3x + -8y & = -2 \\ 1x + 6y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -8 \\ -14 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ 1 & 6 \end{vmatrix}} = \frac{-124}{26}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ 1 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ 1 & 6 \end{vmatrix}} = \frac{-40}{26}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = 13 \\ -17x + -12y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & -7 \\ 16 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -17 & -12 \end{vmatrix}} = \frac{-44}{-155}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ -17 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -17 & -12 \end{vmatrix}} = \frac{269}{-155}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = -2 \\ -4x + 10y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -19 \\ 13 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -4 & 10 \end{vmatrix}} = \frac{227}{-46}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -4 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -4 & 10 \end{vmatrix}} = \frac{31}{-46}$$

Solve the following system:

$$\begin{cases} 3x + 14y &= 8 \\ 9x + 9y &= -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & 14 \\ -7 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 9 & 9 \end{vmatrix}} = \frac{170}{-99}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 9 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 9 & 9 \end{vmatrix}} = \frac{-93}{-99}$$

Solve the following system:

$$\begin{cases} 3x + -1y &= 9 \\ -5x + -14y &= -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & -1 \\ -7 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -5 & -14 \end{vmatrix}} = \frac{-133}{-47}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ -5 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ -5 & -14 \end{vmatrix}} = \frac{24}{-47}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = -9 \\ -4x + -2y & = 7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -9 & 9 \\ 7 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -4 & -2 \end{vmatrix}} = \frac{-45}{30}$$

$$y = \frac{\begin{vmatrix} 3 & -9 \\ -4 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -4 & -2 \end{vmatrix}} = \frac{-15}{30}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = 6 \\ 14x + 7y & = -19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & 6 \\ -19 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 14 & 7 \end{vmatrix}} = \frac{156}{-63}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ 14 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 14 & 7 \end{vmatrix}} = \frac{-141}{-63}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= 17 \\ 4x + 7y &= 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & -10 \\ 8 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 4 & 7 \end{vmatrix}} = \frac{199}{61}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 4 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 4 & 7 \end{vmatrix}} = \frac{-44}{61}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= 11 \\ 7x + -15y &= 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 11 & -10 \\ 16 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 7 & -15 \end{vmatrix}} = \frac{-5}{25}$$

$$y = \frac{\begin{vmatrix} 3 & 11 \\ 7 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 7 & -15 \end{vmatrix}} = \frac{-29}{25}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = -5 \\ -15x + -13y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -5 & -10 \\ 11 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -15 & -13 \end{vmatrix}} = \frac{175}{-189}$$

$$y = \frac{\begin{vmatrix} 3 & -5 \\ -15 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -15 & -13 \end{vmatrix}} = \frac{-42}{-189}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = -16 \\ 3x + 11y & = -18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & -10 \\ -18 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 3 & 11 \end{vmatrix}} = \frac{-356}{63}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ 3 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 3 & 11 \end{vmatrix}} = \frac{-6}{63}$$

Solve the following system:

$$\begin{cases} 3x + 18y & = 17 \\ 3x + -1y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & 18 \\ -3 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 3 & -1 \end{vmatrix}} = \frac{37}{-57}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 3 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 3 & -1 \end{vmatrix}} = \frac{-60}{-57}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = 5 \\ -8x + -16y & = -8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & -7 \\ -8 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -8 & -16 \end{vmatrix}} = \frac{-136}{-104}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -8 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -8 & -16 \end{vmatrix}} = \frac{16}{-104}$$

Solve the following system:

$$\begin{cases} 3x + -14y &= 13 \\ 8x + -6y &= -8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & -14 \\ -8 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ 8 & -6 \end{vmatrix}} = \frac{-190}{94}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ 8 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ 8 & -6 \end{vmatrix}} = \frac{-128}{94}$$

Solve the following system:

$$\begin{cases} 3x + -4y &= -5 \\ -13x + 18y &= 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -5 & -4 \\ 11 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ -13 & 18 \end{vmatrix}} = \frac{-46}{2}$$

$$y = \frac{\begin{vmatrix} 3 & -5 \\ -13 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ -13 & 18 \end{vmatrix}} = \frac{-32}{2}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = -4 \\ -1x + -5y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 6 \\ 15 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -1 & -5 \end{vmatrix}} = \frac{-70}{-9}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -1 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -1 & -5 \end{vmatrix}} = \frac{41}{-9}$$

Solve the following system:

$$\begin{cases} 3x + -20y & = 4 \\ 9x + -20y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & -20 \\ 20 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 9 & -20 \end{vmatrix}} = \frac{320}{120}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ 9 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ 9 & -20 \end{vmatrix}} = \frac{24}{120}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = -12 \\ 14x + -7y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -6 \\ 10 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 14 & -7 \end{vmatrix}} = \frac{144}{63}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 14 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 14 & -7 \end{vmatrix}} = \frac{198}{63}$$

Solve the following system:

$$\begin{cases} 3x + -12y & = 19 \\ 13x + -16y & = -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 19 & -12 \\ -4 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ 13 & -16 \end{vmatrix}} = \frac{-352}{108}$$

$$y = \frac{\begin{vmatrix} 3 & 19 \\ 13 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ 13 & -16 \end{vmatrix}} = \frac{-259}{108}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = 15 \\ -16x + 16y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & 1 \\ -11 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -16 & 16 \end{vmatrix}} = \frac{251}{64}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -16 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -16 & 16 \end{vmatrix}} = \frac{207}{64}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = -6 \\ 9x + -14y & = 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -6 & -6 \\ 8 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 9 & -14 \end{vmatrix}} = \frac{132}{12}$$

$$y = \frac{\begin{vmatrix} 3 & -6 \\ 9 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 9 & -14 \end{vmatrix}} = \frac{78}{12}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = 3 \\ -1x + -8y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 3 & 8 \\ 12 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -1 & -8 \end{vmatrix}} = \frac{-120}{-16}$$

$$y = \frac{\begin{vmatrix} 3 & 3 \\ -1 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -1 & -8 \end{vmatrix}} = \frac{39}{-16}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -4 \\ -8x + 3y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 8 \\ 12 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -8 & 3 \end{vmatrix}} = \frac{-108}{73}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -8 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -8 & 3 \end{vmatrix}} = \frac{4}{73}$$

Solve the following system:

$$\begin{cases} 3x + -12y &= -20 \\ -10x + 4y &= -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & -12 \\ -1 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -10 & 4 \end{vmatrix}} = \frac{-92}{-108}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ -10 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -12 \\ -10 & 4 \end{vmatrix}} = \frac{-203}{-108}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= -13 \\ -9x + -7y &= 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & -19 \\ 19 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -9 & -7 \end{vmatrix}} = \frac{452}{-192}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ -9 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -9 & -7 \end{vmatrix}} = \frac{-60}{-192}$$

Solve the following system:

$$\begin{cases} 3x + 4y & = -1 \\ 18x + -10y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & 4 \\ 9 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 18 & -10 \end{vmatrix}} = \frac{-26}{-102}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 18 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 18 & -10 \end{vmatrix}} = \frac{45}{-102}$$

Solve the following system:

$$\begin{cases} 3x + 7y & = 19 \\ -9x + 16y & = 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 19 & 7 \\ 19 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -9 & 16 \end{vmatrix}} = \frac{171}{111}$$

$$y = \frac{\begin{vmatrix} 3 & 19 \\ -9 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -9 & 16 \end{vmatrix}} = \frac{228}{111}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = -3 \\ -5x + -19y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -3 & 17 \\ 15 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ -5 & -19 \end{vmatrix}} = \frac{-198}{28}$$

$$y = \frac{\begin{vmatrix} 3 & -3 \\ -5 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ -5 & -19 \end{vmatrix}} = \frac{30}{28}$$

Solve the following system:

$$\begin{cases} 3x + -14y & = 10 \\ -1x + 11y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & -14 \\ 13 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ -1 & 11 \end{vmatrix}} = \frac{292}{19}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ -1 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ -1 & 11 \end{vmatrix}} = \frac{49}{19}$$

Solve the following system:

$$\begin{cases} 3x + 13y & = -15 \\ 17x + 18y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & 13 \\ 9 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 17 & 18 \end{vmatrix}} = \frac{-387}{-167}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ 17 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 17 & 18 \end{vmatrix}} = \frac{282}{-167}$$

Solve the following system:

$$\begin{cases} 3x + 13y & = -8 \\ -12x + -4y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 13 \\ -11 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ -12 & -4 \end{vmatrix}} = \frac{175}{144}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ -12 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ -12 & -4 \end{vmatrix}} = \frac{-129}{144}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = 8 \\ -20x + 7y & = -6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & 9 \\ -6 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -20 & 7 \end{vmatrix}} = \frac{110}{201}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ -20 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ -20 & 7 \end{vmatrix}} = \frac{142}{201}$$

Solve the following system:

$$\begin{cases} 3x + 13y & = 19 \\ 15x + 4y & = -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 19 & 13 \\ -13 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 15 & 4 \end{vmatrix}} = \frac{245}{-183}$$

$$y = \frac{\begin{vmatrix} 3 & 19 \\ 15 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 15 & 4 \end{vmatrix}} = \frac{-324}{-183}$$

Solve the following system:

$$\begin{cases} 3x + -16y &= -19 \\ 13x + 18y &= 0 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -19 & -16 \\ 0 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 13 & 18 \end{vmatrix}} = \frac{-342}{262}$$

$$y = \frac{\begin{vmatrix} 3 & -19 \\ 13 & 0 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 13 & 18 \end{vmatrix}} = \frac{247}{262}$$

Solve the following system:

$$\begin{cases} 3x + 20y &= 0 \\ 18x + -16y &= -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & 20 \\ -13 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 18 & -16 \end{vmatrix}} = \frac{260}{-408}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ 18 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 18 & -16 \end{vmatrix}} = \frac{-39}{-408}$$

Solve the following system:

$$\begin{cases} 3x + -13y & = -15 \\ -20x + 1y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & -13 \\ 12 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ -20 & 1 \end{vmatrix}} = \frac{141}{-257}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -20 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ -20 & 1 \end{vmatrix}} = \frac{-264}{-257}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = 4 \\ 18x + -2y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & 3 \\ 16 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 18 & -2 \end{vmatrix}} = \frac{-56}{-60}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ 18 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 18 & -2 \end{vmatrix}} = \frac{-24}{-60}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = -15 \\ 8x + 12y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & -7 \\ 20 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 8 & 12 \end{vmatrix}} = \frac{-40}{92}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ 8 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 8 & 12 \end{vmatrix}} = \frac{180}{92}$$

Solve the following system:

$$\begin{cases} 3x + 11y & = -2 \\ -3x + 18y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & 11 \\ -14 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -3 & 18 \end{vmatrix}} = \frac{118}{87}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -3 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -3 & 18 \end{vmatrix}} = \frac{-48}{87}$$

Solve the following system:

$$\begin{cases} 3x + -16y &= 15 \\ -14x + 6y &= -16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -16 \\ -16 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -14 & 6 \end{vmatrix}} = \frac{-166}{-206}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -14 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -14 & 6 \end{vmatrix}} = \frac{162}{-206}$$

Solve the following system:

$$\begin{cases} 3x + -9y &= -2 \\ -15x + 13y &= -18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -9 \\ -18 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -15 & 13 \end{vmatrix}} = \frac{-188}{-96}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -15 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -15 & 13 \end{vmatrix}} = \frac{-84}{-96}$$

Solve the following system:

$$\begin{cases} 3x + 7y & = -10 \\ -5x + 17y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & 7 \\ 9 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -5 & 17 \end{vmatrix}} = \frac{-233}{86}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ -5 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -5 & 17 \end{vmatrix}} = \frac{-23}{86}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = 5 \\ -6x + 7y & = -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & 6 \\ -13 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -6 & 7 \end{vmatrix}} = \frac{113}{57}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -6 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -6 & 7 \end{vmatrix}} = \frac{-9}{57}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = 12 \\ 12x + 11y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 12 & -7 \\ -3 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 12 & 11 \end{vmatrix}} = \frac{111}{117}$$

$$y = \frac{\begin{vmatrix} 3 & 12 \\ 12 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 12 & 11 \end{vmatrix}} = \frac{-153}{117}$$

Solve the following system:

$$\begin{cases} 3x + 19y & = 7 \\ -2x + -11y & = -5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 19 \\ -5 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -2 & -11 \end{vmatrix}} = \frac{18}{5}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -2 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -2 & -11 \end{vmatrix}} = \frac{-1}{5}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = 9 \\ -4x + 7y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & 2 \\ 11 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -4 & 7 \end{vmatrix}} = \frac{41}{29}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ -4 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ -4 & 7 \end{vmatrix}} = \frac{69}{29}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = -12 \\ 14x + -20y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & 17 \\ -3 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 14 & -20 \end{vmatrix}} = \frac{291}{-298}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 14 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 14 & -20 \end{vmatrix}} = \frac{159}{-298}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = -4 \\ -20x + -2y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 1 \\ 1 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -20 & -2 \end{vmatrix}} = \frac{7}{14}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -20 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -20 & -2 \end{vmatrix}} = \frac{-77}{14}$$

Solve the following system:

$$\begin{cases} 3x + 20y & = 14 \\ 12x + -18y & = -12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 14 & 20 \\ -12 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 12 & -18 \end{vmatrix}} = \frac{-12}{-294}$$

$$y = \frac{\begin{vmatrix} 3 & 14 \\ 12 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 12 & -18 \end{vmatrix}} = \frac{-204}{-294}$$

Solve the following system:

$$\begin{cases} 3x + 13y & = -8 \\ 13x + -17y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 13 \\ -11 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 13 & -17 \end{vmatrix}} = \frac{279}{-220}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 13 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & 13 \\ 13 & -17 \end{vmatrix}} = \frac{71}{-220}$$

Solve the following system:

$$\begin{cases} 3x + 4y & = 12 \\ 14x + -7y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 12 & 4 \\ 1 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 14 & -7 \end{vmatrix}} = \frac{-88}{-77}$$

$$y = \frac{\begin{vmatrix} 3 & 12 \\ 14 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 14 & -7 \end{vmatrix}} = \frac{-165}{-77}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = -3 \\ 17x + -17y & = 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -3 & 2 \\ 17 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 17 & -17 \end{vmatrix}} = \frac{17}{-85}$$

$$y = \frac{\begin{vmatrix} 3 & -3 \\ 17 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 17 & -17 \end{vmatrix}} = \frac{102}{-85}$$

Solve the following system:

$$\begin{cases} 3x + -18y & = 0 \\ -6x + -2y & = -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & -18 \\ -7 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ -6 & -2 \end{vmatrix}} = \frac{-126}{-114}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ -6 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ -6 & -2 \end{vmatrix}} = \frac{-21}{-114}$$

Solve the following system:

$$\begin{cases} 3x + 11y & = -16 \\ -9x + 8y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 11 \\ 1 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -9 & 8 \end{vmatrix}} = \frac{-139}{123}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ -9 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -9 & 8 \end{vmatrix}} = \frac{-141}{123}$$

Solve the following system:

$$\begin{cases} 3x + -17y & = 18 \\ 5x + -11y & = -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & -17 \\ -1 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ 5 & -11 \end{vmatrix}} = \frac{-215}{52}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ 5 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ 5 & -11 \end{vmatrix}} = \frac{-93}{52}$$

Solve the following system:

$$\begin{cases} 3x + -4y &= -3 \\ 6x + 19y &= -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -3 & -4 \\ -1 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 6 & 19 \end{vmatrix}} = \frac{-61}{81}$$

$$y = \frac{\begin{vmatrix} 3 & -3 \\ 6 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 6 & 19 \end{vmatrix}} = \frac{15}{81}$$

Solve the following system:

$$\begin{cases} 3x + -19y &= 5 \\ -18x + 5y &= -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & -19 \\ -4 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -18 & 5 \end{vmatrix}} = \frac{-51}{-327}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -18 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -18 & 5 \end{vmatrix}} = \frac{78}{-327}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = -8 \\ -20x + 5y & = 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & 1 \\ 8 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -20 & 5 \end{vmatrix}} = \frac{-48}{35}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ -20 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -20 & 5 \end{vmatrix}} = \frac{-136}{35}$$

Solve the following system:

$$\begin{cases} 3x + 20y & = 1 \\ 10x + -20y & = 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 1 & 20 \\ 17 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 10 & -20 \end{vmatrix}} = \frac{-360}{-260}$$

$$y = \frac{\begin{vmatrix} 3 & 1 \\ 10 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 10 & -20 \end{vmatrix}} = \frac{41}{-260}$$

Solve the following system:

$$\begin{cases} 3x + 14y & = 9 \\ 5x + -6y & = 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & 14 \\ 8 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 5 & -6 \end{vmatrix}} = \frac{-166}{-88}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 5 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & 14 \\ 5 & -6 \end{vmatrix}} = \frac{-21}{-88}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = -17 \\ 13x + 2y & = -15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -17 & -5 \\ -15 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 13 & 2 \end{vmatrix}} = \frac{-109}{71}$$

$$y = \frac{\begin{vmatrix} 3 & -17 \\ 13 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 13 & 2 \end{vmatrix}} = \frac{176}{71}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = -6 \\ 15x + 2y & = -8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -6 & -3 \\ -8 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ 15 & 2 \end{vmatrix}} = \frac{-36}{51}$$

$$y = \frac{\begin{vmatrix} 3 & -6 \\ 15 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ 15 & 2 \end{vmatrix}} = \frac{66}{51}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = 19 \\ 5x + 17y & = 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 19 & -10 \\ 8 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 5 & 17 \end{vmatrix}} = \frac{403}{101}$$

$$y = \frac{\begin{vmatrix} 3 & 19 \\ 5 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ 5 & 17 \end{vmatrix}} = \frac{-71}{101}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -5 \\ 14x + 2y & = 9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -5 & 8 \\ 9 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 14 & 2 \end{vmatrix}} = \frac{-82}{-106}$$

$$y = \frac{\begin{vmatrix} 3 & -5 \\ 14 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 14 & 2 \end{vmatrix}} = \frac{97}{-106}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = 16 \\ -19x + 9y & = 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 16 & -19 \\ 14 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -19 & 9 \end{vmatrix}} = \frac{410}{-334}$$

$$y = \frac{\begin{vmatrix} 3 & 16 \\ -19 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -19 & 9 \end{vmatrix}} = \frac{346}{-334}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = -14 \\ -18x + 14y & = -1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -14 & 12 \\ -1 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -18 & 14 \end{vmatrix}} = \frac{-184}{258}$$

$$y = \frac{\begin{vmatrix} 3 & -14 \\ -18 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -18 & 14 \end{vmatrix}} = \frac{-255}{258}$$

Solve the following system:

$$\begin{cases} 3x + 20y & = -13 \\ 17x + 2y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 20 \\ -3 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 17 & 2 \end{vmatrix}} = \frac{34}{-334}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 17 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 17 & 2 \end{vmatrix}} = \frac{212}{-334}$$

Solve the following system:

$$\begin{cases} 3x + -15y & = 6 \\ -2x + -8y & = 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -15 \\ 8 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -2 & -8 \end{vmatrix}} = \frac{72}{-54}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -2 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -2 & -8 \end{vmatrix}} = \frac{36}{-54}$$

Solve the following system:

$$\begin{cases} 3x + -15y & = -8 \\ 12x + 14y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -8 & -15 \\ 11 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 12 & 14 \end{vmatrix}} = \frac{53}{222}$$

$$y = \frac{\begin{vmatrix} 3 & -8 \\ 12 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ 12 & 14 \end{vmatrix}} = \frac{129}{222}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = -16 \\ -16x + -9y & = -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 6 \\ -2 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -16 & -9 \end{vmatrix}} = \frac{156}{69}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ -16 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -16 & -9 \end{vmatrix}} = \frac{-262}{69}$$

Solve the following system:

$$\begin{cases} 3x + -17y & = -20 \\ 7x + -20y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & -17 \\ 1 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ 7 & -20 \end{vmatrix}} = \frac{417}{59}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ 7 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ 7 & -20 \end{vmatrix}} = \frac{143}{59}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = -17 \\ -4x + -12y & = -15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -17 & -7 \\ -15 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -4 & -12 \end{vmatrix}} = \frac{99}{-64}$$

$$y = \frac{\begin{vmatrix} 3 & -17 \\ -4 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ -4 & -12 \end{vmatrix}} = \frac{-113}{-64}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = 3 \\ 8x + 2y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 3 & -9 \\ -14 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 8 & 2 \end{vmatrix}} = \frac{-120}{78}$$

$$y = \frac{\begin{vmatrix} 3 & 3 \\ 8 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 8 & 2 \end{vmatrix}} = \frac{-66}{78}$$

Solve the following system:

$$\begin{cases} 3x + -16y & = 1 \\ 15x + 12y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 1 & -16 \\ 18 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 15 & 12 \end{vmatrix}} = \frac{300}{276}$$

$$y = \frac{\begin{vmatrix} 3 & 1 \\ 15 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 15 & 12 \end{vmatrix}} = \frac{39}{276}$$

Solve the following system:

$$\begin{cases} 3x + -2y & = 4 \\ -17x + 12y & = 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & -2 \\ 3 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -17 & 12 \end{vmatrix}} = \frac{54}{2}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ -17 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -17 & 12 \end{vmatrix}} = \frac{77}{2}$$

Solve the following system:

$$\begin{cases} 3x + 2y & = -3 \\ 7x + 19y & = 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -3 & 2 \\ 19 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 7 & 19 \end{vmatrix}} = \frac{-95}{43}$$

$$y = \frac{\begin{vmatrix} 3 & -3 \\ 7 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & 2 \\ 7 & 19 \end{vmatrix}} = \frac{78}{43}$$

Solve the following system:

$$\begin{cases} 3x + -9y & = 4 \\ -16x + -18y & = -16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 4 & -9 \\ -16 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -16 & -18 \end{vmatrix}} = \frac{-216}{-198}$$

$$y = \frac{\begin{vmatrix} 3 & 4 \\ -16 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ -16 & -18 \end{vmatrix}} = \frac{16}{-198}$$

Solve the following system:

$$\begin{cases} 3x + -11y & = -2 \\ -17x + 19y & = -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -11 \\ -4 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -17 & 19 \end{vmatrix}} = \frac{-82}{-130}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -17 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -17 & 19 \end{vmatrix}} = \frac{-46}{-130}$$

Solve the following system:

$$\begin{cases} 3x + 19y & = 10 \\ -18x + 16y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & 19 \\ 18 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -18 & 16 \end{vmatrix}} = \frac{-182}{390}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ -18 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -18 & 16 \end{vmatrix}} = \frac{234}{390}$$

Solve the following system:

$$\begin{cases} 3x + -10y & = 5 \\ -10x + -18y & = 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & -10 \\ 12 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -10 & -18 \end{vmatrix}} = \frac{30}{-154}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -10 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -10 & -18 \end{vmatrix}} = \frac{86}{-154}$$

Solve the following system:

$$\begin{cases} 3x + 9y & = -1 \\ 20x + 17y & = -10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & 9 \\ -10 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 20 & 17 \end{vmatrix}} = \frac{73}{-129}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 20 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 20 & 17 \end{vmatrix}} = \frac{-10}{-129}$$

Solve the following system:

$$\begin{cases} 3x + 20y &= 7 \\ 12x + 9y &= 7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 20 \\ 7 & 9 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 12 & 9 \end{vmatrix}} = \frac{-77}{-213}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ 12 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 12 & 9 \end{vmatrix}} = \frac{-63}{-213}$$

Solve the following system:

$$\begin{cases} 3x + -18y &= -7 \\ -11x + 8y &= -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & -18 \\ -20 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ -11 & 8 \end{vmatrix}} = \frac{-416}{-174}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ -11 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -18 \\ -11 & 8 \end{vmatrix}} = \frac{-137}{-174}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = 7 \\ -11x + 8y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 12 \\ -9 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -11 & 8 \end{vmatrix}} = \frac{164}{156}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ -11 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ -11 & 8 \end{vmatrix}} = \frac{50}{156}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = -15 \\ -19x + -3y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & -3 \\ 15 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -19 & -3 \end{vmatrix}} = \frac{90}{-66}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ -19 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -19 & -3 \end{vmatrix}} = \frac{-240}{-66}$$

Solve the following system:

$$\begin{cases} 3x + -17y &= 18 \\ -3x + 10y &= 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 18 & -17 \\ 15 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -3 & 10 \end{vmatrix}} = \frac{435}{-21}$$

$$y = \frac{\begin{vmatrix} 3 & 18 \\ -3 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -3 & 10 \end{vmatrix}} = \frac{99}{-21}$$

Solve the following system:

$$\begin{cases} 3x + 5y &= -4 \\ -16x + 6y &= -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 5 \\ -2 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -16 & 6 \end{vmatrix}} = \frac{-14}{98}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -16 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ -16 & 6 \end{vmatrix}} = \frac{-70}{98}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = -20 \\ -9x + 17y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -20 & 1 \\ 20 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -9 & 17 \end{vmatrix}} = \frac{-360}{60}$$

$$y = \frac{\begin{vmatrix} 3 & -20 \\ -9 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -9 & 17 \end{vmatrix}} = \frac{-120}{60}$$

Solve the following system:

$$\begin{cases} 3x + -16y & = 2 \\ 16x + -1y & = -6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 2 & -16 \\ -6 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 16 & -1 \end{vmatrix}} = \frac{-98}{253}$$

$$y = \frac{\begin{vmatrix} 3 & 2 \\ 16 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ 16 & -1 \end{vmatrix}} = \frac{-50}{253}$$

Solve the following system:

$$\begin{cases} 3x + -1y &= -12 \\ 5x + 1y &= 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -1 \\ 2 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 5 & 1 \end{vmatrix}} = \frac{-10}{8}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 5 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 5 & 1 \end{vmatrix}} = \frac{66}{8}$$

Solve the following system:

$$\begin{cases} 3x + 18y &= 7 \\ 1x + 14y &= 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 7 & 18 \\ 12 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 1 & 14 \end{vmatrix}} = \frac{-118}{24}$$

$$y = \frac{\begin{vmatrix} 3 & 7 \\ 1 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 1 & 14 \end{vmatrix}} = \frac{29}{24}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = 6 \\ 10x + 18y & = 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & 3 \\ 2 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 10 & 18 \end{vmatrix}} = \frac{102}{24}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ 10 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 10 & 18 \end{vmatrix}} = \frac{-54}{24}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -1 \\ 5x + 18y & = -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & 8 \\ -4 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 5 & 18 \end{vmatrix}} = \frac{14}{14}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ 5 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ 5 & 18 \end{vmatrix}} = \frac{-7}{14}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = -16 \\ 10x + 15y & = -16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & 12 \\ -16 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 10 & 15 \end{vmatrix}} = \frac{-48}{-75}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ 10 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 10 & 15 \end{vmatrix}} = \frac{112}{-75}$$

Solve the following system:

$$\begin{cases} 3x + 10y & = 5 \\ -4x + -8y & = 11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & 10 \\ 11 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & 10 \\ -4 & -8 \end{vmatrix}} = \frac{-150}{16}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ -4 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & 10 \\ -4 & -8 \end{vmatrix}} = \frac{53}{16}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = 5 \\ 19x + 20y & = -10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & 6 \\ -10 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 19 & 20 \end{vmatrix}} = \frac{160}{-54}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ 19 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 19 & 20 \end{vmatrix}} = \frac{-125}{-54}$$

Solve the following system:

$$\begin{cases} 3x + 19y & = 9 \\ 8x + -12y & = 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & 19 \\ 5 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 8 & -12 \end{vmatrix}} = \frac{-203}{-188}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 8 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 8 & -12 \end{vmatrix}} = \frac{-57}{-188}$$

Solve the following system:

$$\begin{cases} 3x + 6y & = -4 \\ 19x + 10y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 6 \\ 10 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 19 & 10 \end{vmatrix}} = \frac{-100}{-84}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ 19 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ 19 & 10 \end{vmatrix}} = \frac{106}{-84}$$

Solve the following system:

$$\begin{cases} 3x + -15y & = -4 \\ -7x + -11y & = 1 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & -15 \\ 1 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -7 & -11 \end{vmatrix}} = \frac{59}{-138}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -7 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -15 \\ -7 & -11 \end{vmatrix}} = \frac{-25}{-138}$$

Solve the following system:

$$\begin{cases} 3x + -7y & = -13 \\ 19x + -15y & = 7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & -7 \\ 7 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 19 & -15 \end{vmatrix}} = \frac{244}{88}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 19 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & -7 \\ 19 & -15 \end{vmatrix}} = \frac{268}{88}$$

Solve the following system:

$$\begin{cases} 3x + -11y & = -11 \\ -4x + 13y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & -11 \\ -14 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -4 & 13 \end{vmatrix}} = \frac{-297}{-5}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ -4 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -4 & 13 \end{vmatrix}} = \frac{-86}{-5}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = 8 \\ 5x + 3y & = 15 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 8 & 12 \\ 15 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 5 & 3 \end{vmatrix}} = \frac{-156}{-51}$$

$$y = \frac{\begin{vmatrix} 3 & 8 \\ 5 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 5 & 3 \end{vmatrix}} = \frac{5}{-51}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = 2 \\ 13x + -14y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 2 & -5 \\ -3 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 13 & -14 \end{vmatrix}} = \frac{-43}{23}$$

$$y = \frac{\begin{vmatrix} 3 & 2 \\ 13 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 13 & -14 \end{vmatrix}} = \frac{-35}{23}$$

Solve the following system:

$$\begin{cases} 3x + 16y & = 13 \\ -3x + 13y & = 4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & 16 \\ 4 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ -3 & 13 \end{vmatrix}} = \frac{105}{87}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ -3 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ -3 & 13 \end{vmatrix}} = \frac{51}{87}$$

Solve the following system:

$$\begin{cases} 3x + 5y & = -11 \\ 4x + 7y & = 13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & 5 \\ 13 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 4 & 7 \end{vmatrix}} = \frac{-142}{1}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ 4 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 5 \\ 4 & 7 \end{vmatrix}} = \frac{83}{1}$$

Solve the following system:

$$\begin{cases} 3x + 10y & = -15 \\ 14x + 13y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -15 & 10 \\ -9 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & 10 \\ 14 & 13 \end{vmatrix}} = \frac{-105}{-101}$$

$$y = \frac{\begin{vmatrix} 3 & -15 \\ 14 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 10 \\ 14 & 13 \end{vmatrix}} = \frac{183}{-101}$$

Solve the following system:

$$\begin{cases} 3x + 7y & = -12 \\ -9x + -9y & = 0 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & 7 \\ 0 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -9 & -9 \end{vmatrix}} = \frac{108}{36}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ -9 & 0 \end{vmatrix}}{\begin{vmatrix} 3 & 7 \\ -9 & -9 \end{vmatrix}} = \frac{-108}{36}$$

Solve the following system:

$$\begin{cases} 3x + -2y & = -3 \\ -19x + -18y & = -11 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -3 & -2 \\ -11 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -19 & -18 \end{vmatrix}} = \frac{32}{-92}$$

$$y = \frac{\begin{vmatrix} 3 & -3 \\ -19 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -19 & -18 \end{vmatrix}} = \frac{-90}{-92}$$

Solve the following system:

$$\begin{cases} 3x + 8y & = -4 \\ -14x + -6y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & 8 \\ 18 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -14 & -6 \end{vmatrix}} = \frac{-120}{94}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -14 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 8 \\ -14 & -6 \end{vmatrix}} = \frac{-2}{94}$$

Solve the following system:

$$\begin{cases} 3x + 16y & = 0 \\ -12x + 17y & = -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & 16 \\ -20 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ -12 & 17 \end{vmatrix}} = \frac{320}{243}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ -12 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ -12 & 17 \end{vmatrix}} = \frac{-60}{243}$$

Solve the following system:

$$\begin{cases} 3x + 3y & = -18 \\ -17x + -12y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -18 & 3 \\ -3 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -17 & -12 \end{vmatrix}} = \frac{225}{15}$$

$$y = \frac{\begin{vmatrix} 3 & -18 \\ -17 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ -17 & -12 \end{vmatrix}} = \frac{-315}{15}$$

Solve the following system:

$$\begin{cases} 3x + -2y & = 10 \\ 10x + 12y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & -2 \\ -9 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 10 & 12 \end{vmatrix}} = \frac{102}{56}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ 10 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 10 & 12 \end{vmatrix}} = \frac{-127}{56}$$

Solve the following system:

$$\begin{cases} 3x + 17y & = 15 \\ 4x + -6y & = 0 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & 17 \\ 0 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 4 & -6 \end{vmatrix}} = \frac{-90}{-86}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ 4 & 0 \end{vmatrix}}{\begin{vmatrix} 3 & 17 \\ 4 & -6 \end{vmatrix}} = \frac{-60}{-86}$$

Solve the following system:

$$\begin{cases} 3x + -11y &= -9 \\ 11x + -2y &= -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -9 & -11 \\ -9 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ 11 & -2 \end{vmatrix}} = \frac{-81}{115}$$

$$y = \frac{\begin{vmatrix} 3 & -9 \\ 11 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ 11 & -2 \end{vmatrix}} = \frac{72}{115}$$

Solve the following system:

$$\begin{cases} 3x + 19y &= -2 \\ -15x + 20y &= -5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & 19 \\ -5 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -15 & 20 \end{vmatrix}} = \frac{55}{345}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -15 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ -15 & 20 \end{vmatrix}} = \frac{-45}{345}$$

Solve the following system:

$$\begin{cases} 3x + -1y &= -10 \\ 19x + 10y &= -6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & -1 \\ -6 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 19 & 10 \end{vmatrix}} = \frac{-106}{49}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ 19 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 19 & 10 \end{vmatrix}} = \frac{172}{49}$$

Solve the following system:

$$\begin{cases} 3x + 15y &= -13 \\ 4x + -15y &= 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 15 \\ 17 & -15 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ 4 & -15 \end{vmatrix}} = \frac{-60}{-105}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 4 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & 15 \\ 4 & -15 \end{vmatrix}} = \frac{103}{-105}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = 15 \\ -19x + -5y & = -4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -19 \\ -4 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -19 & -5 \end{vmatrix}} = \frac{-151}{-376}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -19 & -4 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -19 & -5 \end{vmatrix}} = \frac{273}{-376}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = -10 \\ -12x + 19y & = 8 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -10 & -3 \\ 8 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -12 & 19 \end{vmatrix}} = \frac{-166}{21}$$

$$y = \frac{\begin{vmatrix} 3 & -10 \\ -12 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -12 & 19 \end{vmatrix}} = \frac{-96}{21}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = 6 \\ -4x + -6y & = -19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 6 & -6 \\ -19 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -4 & -6 \end{vmatrix}} = \frac{-150}{-42}$$

$$y = \frac{\begin{vmatrix} 3 & 6 \\ -4 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -4 & -6 \end{vmatrix}} = \frac{-33}{-42}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = 5 \\ 4x + -19y & = 10 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 5 & 12 \\ 10 & -19 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 4 & -19 \end{vmatrix}} = \frac{-215}{-105}$$

$$y = \frac{\begin{vmatrix} 3 & 5 \\ 4 & 10 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 4 & -19 \end{vmatrix}} = \frac{10}{-105}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = 15 \\ 18x + -12y & = -20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -6 \\ -20 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 18 & -12 \end{vmatrix}} = \frac{-300}{72}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ 18 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ 18 & -12 \end{vmatrix}} = \frac{-330}{72}$$

Solve the following system:

$$\begin{cases} 3x + 19y & = -12 \\ 18x + -10y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & 19 \\ 16 & -10 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 18 & -10 \end{vmatrix}} = \frac{-184}{-372}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 18 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 19 \\ 18 & -10 \end{vmatrix}} = \frac{264}{-372}$$

Solve the following system:

$$\begin{cases} 3x + -6y & = -2 \\ -16x + 19y & = -18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -6 \\ -18 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -16 & 19 \end{vmatrix}} = \frac{-146}{-39}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -16 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -16 & 19 \end{vmatrix}} = \frac{-86}{-39}$$

Solve the following system:

$$\begin{cases} 3x + 4y & = -18 \\ 20x + 16y & = 5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -18 & 4 \\ 5 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 20 & 16 \end{vmatrix}} = \frac{-308}{-32}$$

$$y = \frac{\begin{vmatrix} 3 & -18 \\ 20 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 20 & 16 \end{vmatrix}} = \frac{375}{-32}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = 2 \\ 15x + 18y & = -5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 2 & -5 \\ -5 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 15 & 18 \end{vmatrix}} = \frac{11}{129}$$

$$y = \frac{\begin{vmatrix} 3 & 2 \\ 15 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 15 & 18 \end{vmatrix}} = \frac{-45}{129}$$

Solve the following system:

$$\begin{cases} 3x + 20y & = 15 \\ -2x + 2y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & 20 \\ -3 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ -2 & 2 \end{vmatrix}} = \frac{90}{46}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -2 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ -2 & 2 \end{vmatrix}} = \frac{21}{46}$$

Solve the following system:

$$\begin{cases} 3x + -14y &= -12 \\ 18x + 15y &= 2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -14 \\ 2 & 15 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ 18 & 15 \end{vmatrix}} = \frac{-152}{297}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 18 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ 18 & 15 \end{vmatrix}} = \frac{222}{297}$$

Solve the following system:

$$\begin{cases} 3x + -11y &= -3 \\ -16x + -8y &= 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -3 & -11 \\ 12 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -16 & -8 \end{vmatrix}} = \frac{156}{-200}$$

$$y = \frac{\begin{vmatrix} 3 & -3 \\ -16 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -16 & -8 \end{vmatrix}} = \frac{-12}{-200}$$

Solve the following system:

$$\begin{cases} 3x + -8y & = -2 \\ -3x + -11y & = 20 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -2 & -8 \\ 20 & -11 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ -3 & -11 \end{vmatrix}} = \frac{182}{-57}$$

$$y = \frac{\begin{vmatrix} 3 & -2 \\ -3 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -8 \\ -3 & -11 \end{vmatrix}} = \frac{54}{-57}$$

Solve the following system:

$$\begin{cases} 3x + -14y & = 17 \\ 8x + 19y & = 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & -14 \\ 17 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ 8 & 19 \end{vmatrix}} = \frac{561}{169}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 8 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -14 \\ 8 & 19 \end{vmatrix}} = \frac{-85}{169}$$

Solve the following system:

$$\begin{cases} 3x + -19y & = 17 \\ -7x + 1y & = -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & -19 \\ -9 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -7 & 1 \end{vmatrix}} = \frac{-154}{-130}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ -7 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -19 \\ -7 & 1 \end{vmatrix}} = \frac{92}{-130}$$

Solve the following system:

$$\begin{cases} 3x + 11y & = 12 \\ -6x + 16y & = 7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 12 & 11 \\ 7 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -6 & 16 \end{vmatrix}} = \frac{115}{114}$$

$$y = \frac{\begin{vmatrix} 3 & 12 \\ -6 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 11 \\ -6 & 16 \end{vmatrix}} = \frac{93}{114}$$

Solve the following system:

$$\begin{cases} 3x + 16y & = -9 \\ 20x + 18y & = -18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -9 & 16 \\ -18 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 20 & 18 \end{vmatrix}} = \frac{126}{-266}$$

$$y = \frac{\begin{vmatrix} 3 & -9 \\ 20 & -18 \end{vmatrix}}{\begin{vmatrix} 3 & 16 \\ 20 & 18 \end{vmatrix}} = \frac{126}{-266}$$

Solve the following system:

$$\begin{cases} 3x + -3y & = 10 \\ -3x + 8y & = -5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 10 & -3 \\ -5 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -3 & 8 \end{vmatrix}} = \frac{65}{15}$$

$$y = \frac{\begin{vmatrix} 3 & 10 \\ -3 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ -3 & 8 \end{vmatrix}} = \frac{15}{15}$$

Solve the following system:

$$\begin{cases} 3x + -9y &= 17 \\ 7x + 20y &= 14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 17 & -9 \\ 14 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 7 & 20 \end{vmatrix}} = \frac{466}{123}$$

$$y = \frac{\begin{vmatrix} 3 & 17 \\ 7 & 14 \end{vmatrix}}{\begin{vmatrix} 3 & -9 \\ 7 & 20 \end{vmatrix}} = \frac{-77}{123}$$

Solve the following system:

$$\begin{cases} 3x + -10y &= -16 \\ -1x + 8y &= -2 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & -10 \\ -2 & 8 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -1 & 8 \end{vmatrix}} = \frac{-148}{14}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ -1 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -10 \\ -1 & 8 \end{vmatrix}} = \frac{-22}{14}$$

Solve the following system:

$$\begin{cases} 3x + 18y &= 9 \\ 2x + 7y &= -13 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & 18 \\ -13 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 2 & 7 \end{vmatrix}} = \frac{297}{-15}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 2 & -13 \end{vmatrix}}{\begin{vmatrix} 3 & 18 \\ 2 & 7 \end{vmatrix}} = \frac{-57}{-15}$$

Solve the following system:

$$\begin{cases} 3x + -16y &= -7 \\ -12x + -8y &= -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & -16 \\ -14 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -12 & -8 \end{vmatrix}} = \frac{-168}{-216}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ -12 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -16 \\ -12 & -8 \end{vmatrix}} = \frac{-126}{-216}$$

Solve the following system:

$$\begin{cases} 3x + 20y &= -13 \\ 1x + 6y &= -5 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -13 & 20 \\ -5 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 1 & 6 \end{vmatrix}} = \frac{22}{-2}$$

$$y = \frac{\begin{vmatrix} 3 & -13 \\ 1 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 20 \\ 1 & 6 \end{vmatrix}} = \frac{-2}{-2}$$

Solve the following system:

$$\begin{cases} 3x + 3y &= -1 \\ 2x + -3y &= 1 \end{cases}$$

Cramer cannot work here.

Solve the following system:

$$\begin{cases} 3x + -1y & = 15 \\ 19x + -17y & = -14 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -1 \\ -14 & -17 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 19 & -17 \end{vmatrix}} = \frac{-269}{-32}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ 19 & -14 \end{vmatrix}}{\begin{vmatrix} 3 & -1 \\ 19 & -17 \end{vmatrix}} = \frac{-327}{-32}$$

Solve the following system:

$$\begin{cases} 3x + -11y & = 0 \\ -14x + 13y & = 18 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 0 & -11 \\ 18 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -14 & 13 \end{vmatrix}} = \frac{198}{-115}$$

$$y = \frac{\begin{vmatrix} 3 & 0 \\ -14 & 18 \end{vmatrix}}{\begin{vmatrix} 3 & -11 \\ -14 & 13 \end{vmatrix}} = \frac{54}{-115}$$

Solve the following system:

$$\begin{cases} 3x + -4y &= -12 \\ 17x + 17y &= 17 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -12 & -4 \\ 17 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 17 & 17 \end{vmatrix}} = \frac{-136}{119}$$

$$y = \frac{\begin{vmatrix} 3 & -12 \\ 17 & 17 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 17 & 17 \end{vmatrix}} = \frac{255}{119}$$

Solve the following system:

$$\begin{cases} 3x + -20y &= 15 \\ -1x + -12y &= -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 15 & -20 \\ -7 & -12 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ -1 & -12 \end{vmatrix}} = \frac{-320}{-56}$$

$$y = \frac{\begin{vmatrix} 3 & 15 \\ -1 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & -20 \\ -1 & -12 \end{vmatrix}} = \frac{-6}{-56}$$

Solve the following system:

$$\begin{cases} 3x + -2y &= 13 \\ 2x + 13y &= 3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 13 & -2 \\ 3 & 13 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 2 & 13 \end{vmatrix}} = \frac{175}{43}$$

$$y = \frac{\begin{vmatrix} 3 & 13 \\ 2 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 2 & 13 \end{vmatrix}} = \frac{-17}{43}$$

Solve the following system:

$$\begin{cases} 3x + -6y &= -11 \\ -17x + 6y &= 12 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -11 & -6 \\ 12 & 6 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -17 & 6 \end{vmatrix}} = \frac{6}{-84}$$

$$y = \frac{\begin{vmatrix} 3 & -11 \\ -17 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -6 \\ -17 & 6 \end{vmatrix}} = \frac{-151}{-84}$$

Solve the following system:

$$\begin{cases} 3x + -2y &= -4 \\ 13x + 7y &= -9 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & -2 \\ -9 & 7 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 13 & 7 \end{vmatrix}} = \frac{-46}{47}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ 13 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ 13 & 7 \end{vmatrix}} = \frac{25}{47}$$

Solve the following system:

$$\begin{cases} 3x + -13y &= -4 \\ -17x + -8y &= -6 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -4 & -13 \\ -6 & -8 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ -17 & -8 \end{vmatrix}} = \frac{-46}{-245}$$

$$y = \frac{\begin{vmatrix} 3 & -4 \\ -17 & -6 \end{vmatrix}}{\begin{vmatrix} 3 & -13 \\ -17 & -8 \end{vmatrix}} = \frac{-86}{-245}$$

Solve the following system:

$$\begin{cases} 3x + -5y & = -1 \\ -4x + -3y & = 16 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & -5 \\ 16 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -4 & -3 \end{vmatrix}} = \frac{83}{-29}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ -4 & 16 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ -4 & -3 \end{vmatrix}} = \frac{44}{-29}$$

Solve the following system:

$$\begin{cases} 3x + 12y & = 9 \\ 16x + -20y & = 4 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} 9 & 12 \\ 4 & -20 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 16 & -20 \end{vmatrix}} = \frac{-228}{-252}$$

$$y = \frac{\begin{vmatrix} 3 & 9 \\ 16 & 4 \end{vmatrix}}{\begin{vmatrix} 3 & 12 \\ 16 & -20 \end{vmatrix}} = \frac{-132}{-252}$$

Solve the following system:

$$\begin{cases} 3x + 1y & = -1 \\ -2x + 20y & = -7 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -1 & 1 \\ -7 & 20 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -2 & 20 \end{vmatrix}} = \frac{-13}{62}$$

$$y = \frac{\begin{vmatrix} 3 & -1 \\ -2 & -7 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ -2 & 20 \end{vmatrix}} = \frac{-23}{62}$$

Solve the following system:

$$\begin{cases} 3x + -4y & = -16 \\ 18x + 11y & = -3 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -16 & -4 \\ -3 & 11 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 18 & 11 \end{vmatrix}} = \frac{-188}{105}$$

$$y = \frac{\begin{vmatrix} 3 & -16 \\ 18 & -3 \end{vmatrix}}{\begin{vmatrix} 3 & -4 \\ 18 & 11 \end{vmatrix}} = \frac{279}{105}$$

Solve the following system:

$$\begin{cases} 3x + -17y & = -7 \\ -2x + -16y & = 19 \end{cases}$$

Solution:

$$x = \frac{\begin{vmatrix} -7 & -17 \\ 19 & -16 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -2 & -16 \end{vmatrix}} = \frac{435}{-82}$$

$$y = \frac{\begin{vmatrix} 3 & -7 \\ -2 & 19 \end{vmatrix}}{\begin{vmatrix} 3 & -17 \\ -2 & -16 \end{vmatrix}} = \frac{43}{-82}$$

Solve the following system:

$$\begin{cases} 3x + -18y & = 15 \\ 19x + -12y & = 10 \end{cases}$$

Cramer cannot work here.