Chapter 7. Solving Systems of Linear Equations and Inequalities

Ex. 7.3

Answer 1CU.

Consider the system equations,

$x - y = 14$ ...... (1)

$x + y = 20$ ...... (2)

Since the coefficients of the *y* terms, -1 and 1, are additive inverses, we can eliminate the *y* terms by adding the equations.

$$\begin{array}{rrrrrr} & x & - & y & = & 14 \\ (+) & x & + & y & = & 20 \\ \hline & 2x & & & = & 34 \end{array}$$

Write the equations in column form and add

Notice that the y variable eliminated

$\frac{2x}{2} = \frac{34}{2}$ Divide each side with 2

$x = 17$ Simplify

Answer 2CU.

Consider the system of equations,

$4x + y = -9$ ...... (1)

$4x + 2y = -10$ ...... (2)

Since the coefficients of the *y* terms, 4 and 4, are the same, we can eliminate the *y* terms by subtract the equations.

$$\begin{array}{rrrrrr} & 4x & + & y & = & -9 \\ (-) & 4x & + & 2y & = & -10 \\ \hline & 0 & & -y & = & 1 \end{array}$$

Write the equations in column form and subtract

Notice that the y variable eliminated

$\frac{-y}{-1} = \frac{1}{-1}$ Divide each side with -1

$y = -1$ Simplify

Answer 3CU.

Michael solution:

$$\begin{array}{rl} & 2r+s=5 \\ (+) & \underline{r-s=1} \\ & 3r \quad =6 \\ & r=2 \end{array}$$

$$\begin{aligned} 2r+s&=5 \\ 2(2)+s&=5 \\ 4+s&=5 \\ s&=1 \end{aligned}$$

The solution is $(2,1)$

The solution and procedure is correct.

Yoomee solution:

$$\begin{array}{rl} & 2r+s=5 \\ (-) & \underline{r-s=1} \\ & r \quad =4 \end{array} \quad \text{Wrong} \qquad \begin{array}{rl} & 2r+s=5 \\ (-) & \underline{r-s=1} \\ & r+2s=4 \end{array} \quad \text{Correct}$$

$$\begin{aligned} r-s&=1 \\ 4-s&=1 \\ -s&=-3 \\ s&=3 \end{aligned}$$

The solution is $(4,3)$

The solution is **wrong**

Answer 4CU.

Consider the system equations,

$x-y=14$ ...... (1)

$x+y=20$ ...... (2)

Since the coefficients of the *y* terms, -1 and 1, are additive inverses, we can eliminate the *y* terms by adding the equations.

$$\begin{array}{rcccccc} & x & - & y & = & 14 & \text{Write the equations in column form and add} \\ (+) & x & + & y & = & 20 & \\ \hline & 2x & & & = & 34 & \text{Notice that the } y \text{ variable eliminated} \end{array}$$

$\frac{2x}{2}=\frac{34}{2}$ Divide each side with 2

$x=17$ Simplify

Now substitute -1 for *x* in either equation to find the value of *y*.

$x+y=20$ Second equation

$17+y=20 \quad x=17$

$17+y-17=20-17$ Subtract 17 from each side of the equation

$y=3$ Simplify

The solution is $\boxed{(17,3)}$

Answer 5CU.

Consider the equations,

$2a-3b=-11$ …… (1)

$a+3b=8$ …… (2)

Since the coefficients of the *b* terms, -1 and 1, are additive inverses, we can eliminate the *b* terms by adding the equations.

$$\begin{array}{rrcrcr} & 2a & - & 3b & = & -11 \\ (+) & a & + & 3b & = & 8 \\ \hline & 3a & & & = & -3 \end{array}$$

Write the equations in column form and add

Notice that the b variable eliminated

$\frac{3a}{3}=\frac{-3}{3}$ Divide each side with 3

$a=-1$ Simplify

Now substitute -1 for *a* in either equation to find the value of *b*.

$a+3b=8$ Second equation

$-1+3b=8 \quad a=-1$

$-1+3b+1=8+1$ Add 1to each side of the equation

$3b=9$ Simplify

$b=3$ Divide each side with 3

The solution is $\boxed{(-1,3)}$

Answer 6CU.

Consider the equations,

$4x + y = -9$ ...... (1)

$4x + 2y = -10$ ...... (2)

Since the coefficients of the *y* terms, 4 and 4, are the same, we can eliminate the *y* terms by subtract the equations.

$$\begin{array}{rcccccl} & 4x & + & y & = & -9 & \text{Write the equations in column form and subtract} \\ (-) & 4x & + & 2y & = & -10 & \\ \hline & 0 & & -y & = & 1 & \text{Notice that the } y \text{ variable eliminated} \end{array}$$

$\frac{-y}{-1} = \frac{1}{-1}$ Divide each side with -1

$y = -1$ Simplify

Now substitute -1 for *y* in either equation to find the value of *x*.

$4x + y = -9$ First equation

$4x + (-1) = -9 \quad y = -1$

$4x = -9 + 1$ Add 1 to each side of the equation

$4x = -8$ Simplify

$\frac{4x}{4} = \frac{-8}{4}$ Divide each side with 4

$x = -2$ Simplify

The solution is $\boxed{(-2, -1)}$

Answer 7CU.

Consider the equations,

$6x+2y=-10$ ...... (1)

$2x+2y=-10$ ...... (2)

Since the coefficients of the *y* terms, 2 and 2, are the same, we can eliminate the *y* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 6x & + & 2y & = & -10 \\ (-) & 2x & + & 2y & = & -10 \\ \hline & 8x & & & = & 0 \end{array}$$

Write the equations in column form and subtract

Notice that the y variable eliminated

$\frac{8x}{8}=\frac{0}{8}$ Divide each side with 8

$x=0$ Simplify

Now substitute 0 for *x* in either equation to find the value of *y*.

$2x+2y=-10$ Second equation

$2(0)+2y=-10$ $x=0$

$2y=-10$ Simplify

$\frac{2y}{2}=\frac{-10}{2}$ Divide each side with 2

$y=-5$ Simplify

The solution is $\boxed{(0,-5)}$

Answer 8CU.

Consider the equations,

$2a+4b=30$ ...... (1)

$-2a-2b=-21.5$ ...... (2)

Since the coefficients of the *a* terms, -2 and 2, are additive inverses, we can eliminate the *a* terms by adding the equations.

$$\begin{array}{lrcrcr} & 2a & + & 4b & = & 30 \\ (+) & -2a & - & 2b & = & -21.5 \\ \hline & & & 2b & = & 8.5 \end{array}$$

Write the equations in column form and add

Notice that the a variable eliminated

$\frac{2b}{2}=\frac{8.5}{2}$ Divide each side with 2

$b=4.25$ Simplify

Now substitute 4.25 for *b* in either equation to find the value of *a*.

$2a+4b=30$ First equation

$2a+4(4.25)=30$ $b=4.25$

$2a+17=30$ Simplify

$2a+17-17=30-17$ Subtract 17 from each side

$2a=13$ Simplify

$\frac{2a}{2}=\frac{13}{2}$ Divide each side with 2

$a=6.5$ Simplify

The solution is $\boxed{(6.5,4.25)}$

Answer 9CU.

Consider the equations,

$-4m+2n=6$ ...... (1)

$-4m+n=8$ ...... (2)

Since the coefficients of the *m* terms, 4 and 4, are the same, we can eliminate the *m* terms by subtracting the equations.

$$\begin{array}{rrrrrl} & -4m & + & 2n & = & 6 \\ (-) & -4m & + & n & = & 8 \\ \hline & & & n & = & -2 \end{array}$$

Write the equations in column form and add

Notice that the m variable eliminated

Now substitute 14 for *n* in either equation to find the value of *m*.

$-4m+2n=6$ First equation

$-4m+2(-2)=6$ $n=-2$

$-4m-4=6$ Simplify

$-4m-4+4=6+4$ Add 4 to each side

$-4m=10$ Simplify

$\frac{-4m}{-4}=\frac{10}{-4}$ Divide each side with -4

$m=-2.5$ Simplify

The solution is $\boxed{(-2.5,-2)}$

Answer 10CU.

Let the first number be *m* and the second number be *n*

The sum of the numbers is 24

That is $m+n=24$ ...... (1)

Five times first number minus the second number is 12

That is $5m-n=12$ ...... (2)

Since the coefficients of the *m* terms, 1 and -1, are additive, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{rrrrrl} & m & + & n & = & 24 \\ (+) & 5m & - & n & = & 12 \\ \hline & 6m & & & = & 36 \end{array}$$

Write the equations in column form and add

Notice that the n variable eliminated

$\frac{6m}{6}=\frac{36}{6}$ Divide each side with 6

$m=6$ Simplify

Now substitute 6 for *m* in either equation to find the value of *n*.

$m+n=24$ First equation

$6+n=24 \quad m=6$

$6+n-6=24-6$ Subtract 6 from each side

$n=18$ Simplify

The numbers are $\boxed{6 \text{ and } 18}$

Answer 11CU.

Consider the equations,

$2x+7y=17$ ...... (1)

$2x+5y=11$ ...... (2)

Since the coefficients of the *y* terms, 2 and 2, are the same, we can eliminate the *x* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 2x & + & 7y & = & 17 \\ (-) & 2x & + & 5y & = & 11 \\ \hline & & & 2y & = & 6 \end{array}$$

Write the equations in column form and subtract

Notice that the x variable eliminated

The correct option is **D**

Answer 12PA.

Consider the equations,

$x+y=-3$ ...... (1)

$x-y=1$ ...... (2)

Since the coefficients of the *y* terms, -1 and 1, are additive inverses, we can eliminate the *y* terms by adding the equations.

$$\begin{array}{rrcrcr} & x & + & y & = & -3 \\ (+) & x & - & y & = & 1 \\ \hline & 2x & & & = & -2 \end{array}$$

Write the equations in column form and add

Notice that the y variable eliminated

$\frac{2x}{2}=\frac{-2}{2}$ Divide each side with 2

$x=-1$ Simplify

Now substitute -1 for *x* in either equation to find the value of *y*.

$x-y=1$ Second equation

$-1-y=1 \quad x=-1$

$-1-y+1=1+1$ Add 1 to each side of the equation

$-y=2$ Simplify

$(-y)\times-1=2\times-1$ Multiply each side with -1

$y=-2$ Simplify

The solution is $\boxed{(-1,-2)}$

Answer 13PA.

Consider the equations,

$s - t = 4$ ...... (1)

$s + t = 2$ ...... (2)

Since the coefficients of the *t* terms, -1 and 1, are additive inverses, we can eliminate the *t* terms by adding the equations.

$$\begin{array}{rrrrrr} & s & - & t & = & 4 \\ (+) & s & + & t & = & 2 \\ \hline & 2s & & & = & 6 \end{array}$$

Write the equations in column form and add

Notice that the *t* variable eliminated

$\frac{2s}{2} = \frac{6}{2}$ Divide each side with 2

$s = 3$ Simplify

Now substitute 3 for *s* in either equation to find the value of *s*.

$s + t = 2$ Second equation

$3 + t = 2 \quad s = 3$

$3 + t - 3 = 2 - 3$ Subtract 3 from each side of the equation

$t = -1$ Simplify

The solution is $\boxed{(3, -1)}$

Answer 14PA.

Consider the equations,

$3m - 2n = 13$ ...... (1)

$m + 2n = 7$ ...... (2)

Since the coefficients of the *n* terms, -2 and 2, are additive inverses, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{rrrrrr} & 3m & - & 2n & = & 13 \\ (+) & m & + & 2n & = & 7 \\ \hline & 4m & & & = & 20 \end{array}$$

Write the equations in column form and add

Notice that the *n* variable eliminated

$\frac{4m}{4} = \frac{20}{4}$ Divide each side with 4

$m = 5$ Simplify

Now substitute 5 for *m* in either equation to find the value of *m*.

$m+2n=7$ Second equation

$5+2n=7 \quad m=5$

$5+2n-5=7-5$ Subtract 5 from each side of the equation

$2n=2$ Simplify

$\frac{2n}{2}=\frac{2}{2}$ Divide each side with 2

$n=1$ Simplify

The solution is $\boxed{(5,1)}$

Answer 15PA.

Consider the equations,

$-4x+2y=8$ ...... (1)

$4x-3y=-10$ ...... (2)

Since the coefficients of the *x* terms, -4 and 4, are additive inverses, we can eliminate the *x* terms by adding the equations.

$$\begin{array}{rrcrcr} & -4x & + & 2y & = & 8 \\ (+) & 4x & - & 3y & = & -10 \\ \hline & & & -y & = & -2 \end{array}$$

Write the equations in column form and add

Notice that the x variable eliminated

$\frac{-y}{-1}=\frac{-2}{-1}$ Divide each side with -1

$y=2$ Simplify

Now substitute 2 for *y* in either equation to find the value of *x*.

$4x-3y=-10$ Second equation

$4x-3(2)=-10 \quad y=2$

$4x-6=-10$ Simplify

$4x-6+6=-10+6$ Add 6 to each side of the equation

$4x=-4$ Simplify

$\frac{4x}{4}=\frac{-4}{4}$ Divide each side with 4

$x=-1$ Simplify

The solution is $\boxed{(-1,2)}$

Answer 16PA.

Consider the equations,

$3a+b=5$ ...... (1)

$2a+b=10$ ...... (2)

Since the coefficients of the *b* terms, 1 and 1, are the same, we can eliminate the *x* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 3a & + & b & = & 5 \\ (-) & 2a & + & b & = & 10 \\ \hline & a & & & = & -5 \end{array}$$

Write the equations in column form and add

Notice that the b variable eliminated

Now substitute -5 for *a* in either equation to find the value of *b*.

$2a+b=10$ Second equation

$2(-5)+b=10 \quad a=-5$

$-10+b=10$ Simplify

$-10+b+10=10+10$ Add 6 to each side of the equation

$b=20$ Simplify

The solution is $\boxed{(-5,20)}$

Answer 17PA.

Consider the equations,

$2m-5n=-6$ ...... (1)

$2m-7n=-14$ ...... (2)

Since the coefficients of the *m* terms, 2 and 2, are the same, we can eliminate the *m* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 2m & - & 5n & = & -6 \\ (-) & 2m & - & 7n & = & -14 \\ \hline & & & 2n & = & 8 \end{array}$$

Write the equations in column form and subtract

Notice that the m variable eliminated

$\frac{2n}{2}=\frac{8}{2}$ Divide each side with 2

$n=4$ Simplify

Now substitute 4 for *n* in either equation to find the value of *m*.

$2m - 7n = -14$ Second equation

$2m - 7(4) = -14 \quad n = 4$

$2m - 28 = -14$ Simplify

$2m - 28 + 28 = -14 + 28$ Add 28 to each side of the equation

$2m = 14$ Simplify

$\frac{2m}{2} = \frac{14}{2}$ Divide each side with 2

$m = 7$ Simplify

The solution is $\boxed{(7,4)}$

Answer 18PA.

Consider the equations,

$3r - 5s = -35$ ...... (1)

$2r - 5s = -30$ ...... (2)

Since the coefficients of the *s* terms, -5 and -5, are the same, we can eliminate the *s* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 3r & - & 5s & = & -35 \\ (-) & 2r & - & 5s & = & -30 \\ \hline & r & & & = & -5 \end{array}$$

Write the equations in column form and subtract

Notice that the s variable eliminated

$r = -5$ Simplify

Now substitute -5 for *r* in either equation to find the value of *s*.

$2r - 5s = -30$ Second equation

$2(-5) - 5s = -30 \quad r = -5$

$-10 - 5s = -30$ Simplify

$-10 - 5s + 10 = -30 + 10$ Add 10 to each side of the equation

$-5s = -20$ Simplify

$\frac{-5s}{-5} = \frac{-20}{-5}$ Divide each side with -5

$s = 4$ Simplify

The solution is $\boxed{(-5,4)}$

Answer 19PA.

Consider the equations,

$13a+5b=-11$ ...... (1)

$13a+11b=7$ ...... (2)

Since the coefficients of the *s* terms, 13 and 13, are the same, we can eliminate the *a* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 13a & + & 5b & = & -11 \\ (-) & 13a & + & 11b & = & 7 \\ \hline & & & -6b & = & -18 \end{array}$$

Write the equations in column form and subtract

Notice that the a variable eliminated

$\dfrac{-6b}{-6}=\dfrac{-18}{-6}$ Divide each side with -6

$b=3$ Simplify

Now substitute 3 for *b* in either equation to find the value of *a*.

$13a+11b=7$ Second equation

$13a+11(3)=7$ $\quad b=3$

$13a+33=7$ Simplify

$13a+33-33=7-33$ Subtract 33 from each side of the equation

$13a=-26$ Simplify

$\dfrac{13a}{13}=\dfrac{-26}{13}$ Divide each side with 13

$a=-2$ Simplify

The solution is $\boxed{(-2,3)}$

Answer 20PA.

Consider the equations,

$3x-5y=16$ ...... (1)

$-3x+2y=-10$ ...... (2)

Since the coefficients of the *x* terms, 3 and -3, are additive inverses, we can eliminate the *x* terms by adding the equations.

$$\begin{array}{rrrrrr} & 3x & - & 5y & = & 16 \\ (+) & -3x & + & 2y & = & -10 \\ \hline & & & -3y & = & 6 \end{array}$$

Write the equations in column form and add

Notice that the x variable eliminated

$\frac{-3y}{-3}=\frac{6}{-3}$ Divide each side with -6

$y=-2$ Simplify

Now substitute -2 for *y* in either equation to find the value of *x*.

$-3x+2y=-10$ Second equation

$-3x+2(-2)=-10 \quad y=-2$

$-3x-4=-10$ Simplify

$-3x-4+4=-10+4$ Add 4 to each side of the equation

$-3x=-6$ Simplify

$\frac{-3x}{-3}=\frac{-6}{-3}$ Divide each side with -3

$x=2$ Simplify

The solution is $\boxed{(2,-2)}$

Answer 21PA.

Consider the equations,

$6s+5t=1$ ...... (1)

$6s-5t=11$ ...... (2)

Since the coefficients of the *t* terms, 5 and -5, are additive inverses, we can eliminate the *t* terms by adding the equations.

$$\begin{array}{rrcrcr} & 6s & + & 5t & = & 1 \\ (+) & 6s & - & 5t & = & 11 \\ \hline & 12s & & & = & 12 \end{array}$$

Write the equations in column form and add

Notice that the t variable eliminated

$\frac{12s}{12}=\frac{12}{12}$ Divide each side with 12

$s=1$ Simplify

Now substitute 1 for *s* in either equation to find the value of *t*.

$6s-5t=11$ Second equation

$6(1)-5t=11$ $s=1$

$6-5t=11$ Simplify

$6-5t-6=11-6$ Subtract 6 from each side of the equation

$-5t=5$ Simplify

$\frac{-5t}{-5}=\frac{5}{-5}$ Divide each side with -5

$t=-1$ Simplify

The solution is $\boxed{(1,-1)}$

Answer 22PA.

Consider the equations,

$4x-3y=12$ ...... (1)

$4x+3y=24$ ...... (2)

Since the coefficients of the *y* terms, 3 and -3, are additive inverses, we can eliminate the *y* terms by adding the equations.

$$\begin{array}{rrcrcr} & 4x & - & 3y & = & 12 \\ (+) & 4x & + & 3y & = & 24 \\ \hline & 8x & & & = & 36 \end{array}$$

Write the equations in column form and add

Notice that the y variable eliminated

$\frac{8x}{8}=\frac{36}{8}$ Divide each side with 8

$x=4.5$ Simplify

Now substitute 4.5 for *x* in either equation to find the value of *y*.

$4x+3y=24$ Second equation

$4(4.5)+3y=24$ $x=4.5$

$18+3y=24$ Simplify

$18+3y-18=24-18$ Subtract 18 from each side of the equation

$3y=6$ Simplify

$\frac{3y}{3}=\frac{6}{3}$ Divide each side with 3

$y=2$ Simplify

The solution is $\boxed{(4.5,2)}$

Answer 23PA.

Consider the equations,

$a-2b=5$ ...... (1)

$3a-2b=9$ ...... (2)

Since the coefficients of the *y* terms, 2 and 2, are the same, we can eliminate the *b* terms by subtracting the equations.

$$\begin{array}{rrrrrr} & a & - & 2b & = & 5 \\ (-) & 3a & - & 2b & = & 9 \\ \hline & -2a & & & = & -4 \end{array}$$

Write the equations in column form and add

Notice that the *b* variable eliminated

$\frac{-2a}{-2}=\frac{-4}{-2}$ Divide each side with -2

$a=2$ Simplify

Now substitute 2 for *a* in either equation to find the value of *b*.

$3a-2b=9$ Second equation

$3(2)-2b=9$ $a=2$

$6-2b=9$ Simplify

$6-2b-6=9-6$ Subtract 6 from each side of the equation

$-2b=3$ Simplify

$\frac{-2b}{-2}=\frac{3}{-2}$ Divide each side with -2

$b=-1.5$ Simplify

The solution is $\boxed{(2,-1.5)}$

Answer 24PA.

Consider the equations,

$4x+5y=7$ ...... (1)

$8x+5y=9$ ...... (2)

Since the coefficients of the *y* terms, 5 and 5, are the same, we can eliminate the *y* terms by subtracting the equations.

$$\begin{array}{rrrrrr} & 4x & + & 5y & = & 7 \\ (-) & 8x & + & 5y & = & 9 \\ \hline & -4x & & & = & -2 \end{array}$$

Write the equations in column form and subtract

Notice that the y variable eliminated

$\frac{-4x}{-4}=\frac{-2}{-4}$ Divide each side with -4

$x=0.5$ Simplify

Now substitute 0.5 for *x* in either equation to find the value of *y*.

$8x+5y=9$ Second equation

$8(0.5)+5y=9 \quad x=0.5$

$4+5y=9$ Simplify

$4+5y-4=9-4$ Subtract 4 from each side of the equation

$5y=5$ Simplify

$\frac{5y}{5}=\frac{5}{5}$ Divide each side with 5

$y=1$ Simplify

The solution is $\boxed{(0.5,1)}$

Answer 25PA.

Consider the equations,

$8a+b=1$ ...... (1)

$8a-3b=3$ ...... (2)

Since the coefficients of the *y* terms, 8 and 8, are the same, we can eliminate the *a* terms by subtracting the equations.

$$\begin{array}{rrrrrrr} & 8a & + & b & = & 1 \\ (-) & 8a & - & 3b & = & 3 \\ \hline & & & 4b & = & -2 \end{array}$$

Write the equations in column form and subtract

Notice that the a variable eliminated

$\frac{4b}{4}=\frac{-2}{4}$ Divide each side with 4

$b=-0.5$ Simplify

Now substitute -0.5 for *b* in either equation to find the value of *a*.

$8a-3b=3$ Second equation

$8a-3(-0.5)=3 \quad b=-0.5$

$8a+1.5=3$ Simplify

$8a+1.5-1.5=3-1.5$ Subtract 1.5 from each side of the equation

$8a=1.5$ Simplify

$\frac{8a}{8}=\frac{1.5}{8}$ Divide each side with 8

$a=0.1875$ Simplify

The solution is $\boxed{(0.1875,-0.5)}$

Answer 26PA.

Consider the equations,

$1.44x - 3.24y = -5.58$ ...... (1)

$1.08x + 3.24y = 9.99$ ...... (2)

Since the coefficients of the *y* terms, -3.24 and 3.24, are the additive inverse, we can eliminate the *y* terms by adding the equations.

$$\begin{array}{rrrrrl} & 1.44x & - & 3.24y & = & -5.58 \\ (+) & 1.08x & + & 3.24y & = & 9.99 \\ \hline & 2.52x & & & = & 4.41 \end{array}$$

Write the equations in column form and add

Notice that the y variable eliminated

$\frac{2.52x}{2.52} = \frac{4.41}{2.52}$ Divide each side with 2.52

$x = 1.75$ Simplify

Now substitute 1.75 for *x* in either equation to find the value of *y*.

$1.08x + 3.24y = 9.99$ Second equation

$1.08(1.75) + 3.24y = 9.99$ $x = 1.75$

$1.89 + 3.24y = 9.99$ Simplify

$1.89 + 3.24y - 1.89 = 9.99 - 1.89$ Subtract 1.89 from each side of the equation

$3.24y = 8.10$ Simplify

$\frac{3.24y}{3.24} = \frac{8.10}{3.24}$ Divide each side with 3.24

$y = 2.5$ Simplify

The solution is $\boxed{(1.75, 2.5)}$

Answer 27PA.

Consider the equations,

$7.2m + 4.5n = 129.06$ ...... (1)

$7.2m + 6.7n = 136.54$ ...... (2)

Since the coefficients of the *m* terms, 7.2 and 7.2, are the same, we can eliminate the *m* terms by subtracting the equations.

$$\begin{array}{lrcrcr} & 7.2m & + & 4.5n & = & 129.06 \\ (-) & 7.2m & + & 6.7n & = & 136.54 \\ \hline & & & -2.2n & = & -7.48 \end{array}$$

Write the equations in column form and subtract

Notice that the *m* variable eliminated

$\frac{-2.2n}{-2.2} = \frac{-7.48}{-2.2}$ Divide each side with -2.2

$n = 3.4$ Simplify

Now substitute 3.4 for *n* in either equation to find the value of *m*.

$7.2m + 6.7n = 136.54$ Second equation

$7.2m + 6.7(3.4) = 136.54$ $n = 3.4$

$7.2m + 22.78 = 136.54$ Simplify

$7.2m + 22.78 - 22.78 = 136.54 - 22.78$ Subtract 22.78 from each side of the equation

$7.2m = 113.76$ Simplify

$\frac{7.2m}{7.2} = \frac{113.76}{7.2}$ Divide each side with 3.24

$m = 15.8$ Simplify

The solution is $\boxed{(15.8, 3.4)}$

Answer 28PA.

Consider the equations,

$\frac{3}{5}c-\frac{1}{5}d=9$ ...... (1)

$\frac{7}{5}c+\frac{1}{5}d=11$ ...... (2)

Since the coefficients of the *d* terms, $-\frac{1}{5}$ and $\frac{1}{5}$, are the additive inverses, we can eliminate the *d* terms by adding the equations.

$$\begin{array}{rrcrcr} & \frac{3}{5}c & - & \frac{1}{5}d & = & 9 \\ (+) & \frac{7}{5}c & + & \frac{1}{5}d & = & 11 \\ \hline & 2c & & & = & 20 \end{array}$$

Write the equations in column form and subtract $\frac{2c}{2}=\frac{20}{2}$

Notice that the d variable eliminated

Divide each side with 2

$c=10$ Simplify

Now substitute 10 for *c* in either equation to find the value of *d*.

$\frac{7}{5}c+\frac{1}{5}d=11$ Second equation

$\frac{7}{5}(10)+\frac{1}{5}d=11 \quad c=10$

$14+\frac{1}{5}d=11$ Simplify

$14+\frac{1}{5}d-14=11-14$ Subtract 14 from each side of the equation

$\frac{1}{5}d=-3$ Simplify

$\frac{1}{5}d\times5=-3\times5$ Multiply each side with 5

$d=-15$ Simplify

The solution is $\boxed{(10,-15)}$

Answer 29PA.

Consider the equations,

$$\frac{2}{3}x-\frac{1}{2}y=14 \text{ ...... (1)}$$

$$\frac{5}{6}x-\frac{1}{2}y=18 \text{ ...... (2)}$$

Since the coefficients of the *y* terms, $-\frac{1}{2}$ and $-\frac{1}{2}$, are the same, we can eliminate the *y* terms by subtracting the equations.

$$\begin{array}{rcccl} & \frac{2}{3}x & - & \frac{1}{2}y & = 14 \\ (-) & \frac{5}{6}x & - & \frac{1}{2}y & = 18 \\ \hline & \left(\frac{2}{3}-\frac{5}{6}\right)x & & & = -4 \end{array}$$

Write the equations in column form and subtract

Notice that the y variable eliminated

$-\frac{1}{6}x=-4$ Multiply each side with 6

$x=24$ Simplify

Now substitute 24 for *x* in either equation to find the value of *y*.

$\frac{5}{6}x-\frac{1}{2}y=18$ Second equation

$\frac{5}{6}(24)-\frac{1}{2}y=18 \quad x=24$

$20-\frac{1}{2}y=18$ Simplify

$20-\frac{1}{2}y-20=18-20$ Subtract 14 from each side of the equation

$-\frac{1}{2}y=-2$ Simplify

$-\frac{1}{2}y\times-2=-2\times-2$ Multiply each side with -2

$y=4$ Simplify

The solution is $\boxed{(24,4)}$

Answer 30PA.

Let the first number be *m* and the second number be *n*

The sum of the numbers is 48

That is $m+n=48$ …… (1)

The difference of the numbers is 24

That is $m-n=24$ …… (2)

Since the coefficients of the *m* terms, 1 and -1, are additive, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{rcccccl} & m & + & n & = & 48 \\ (+) & m & - & n & = & 24 \\ \hline & 2m & & & = & 72 \end{array}$$

Write the equations in column form and add

Notice that the n variable eliminated

$\frac{2m}{2}=\frac{72}{2}$ Divide each side with 2

$m=36$ Simplify

Now substitute 36 for *m* in either equation to find the value of *n*.

$m+n=48$ First equation

$36+n=48 \quad m=36$

$36+n-36=48-36$ Subtract 36 from each side

$n=12$ Simplify

The numbers are $\boxed{36 \text{ and } 12}$

Answer 31PA.

Let the first number be *m* and the second number be *n*

The sum of the numbers is 51

That is $m+n=51$ ...... (1)

The difference of the numbers is 13

That is $m-n=13$ ...... (2)

Since the coefficients of the *m* terms, 1 and -1, are additive, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{lccccc} & m & + & n & = & 51 \\ (+) & m & - & n & = & 13 \\ \hline & 2m & & & = & 64 \end{array}$$

Write the equations in column form and add

Notice that the n variable eliminated

$\frac{2m}{2}=\frac{64}{2}$ Divide each side with 2

$m=32$ Simplify

Now substitute 36 for *m* in either equation to find the value of *n*.

$m+n=51$ First equation

$32+n=51 \quad m=32$

$32+n-32=51-32$ Subtract 32 from each side

$n=19$ Simplify

The numbers are $\boxed{32 \text{ and } 19}$

Answer 32PA.

Let the first number be *m* and the second number be *n*

Three times one number added to another number is 18

That is $3m+n=18$ ...... (1)

Twice the first number minus the other number is 12

That is $2m-n=12$ ...... (2)

Since the coefficients of the *m* terms, 1 and -1, are additive, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{rrcrcr} & 3m & + & n & = & 18 \\ (+) & 2m & - & n & = & 12 \\ \hline & 5m & & & = & 30 \end{array}$$

Write the equations in column form and add

Notice that the n variable eliminated

$\frac{5m}{5}=\frac{30}{5}$ Divide each side with 5

$m=6$ Simplify

Now substitute 6 for *m* in either equation to find the value of *n*.

$3m+n=18$ First equation

$3(6)+n=18 \quad m=6$

$18+n-18=18-18$ Subtract 18 from each side

$n=0$ Simplify

The numbers are $\boxed{6 \text{ and } 0}$

Answer 33PA.

Let the first number be *m* and the second number be *n*

One number added to twice the second number is 23

That is $m+2n=23$ …… (1)

Four times the first number added twice the other number is 38

That is $4m+2n=38$ …… (2)

Since the coefficients of the *m* terms, 1 and -1, are the same, we can eliminate the *n* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & m & + & 2n & = & 23 \\ (-) & 4m & + & 2n & = & 38 \\ \hline & -3m & & & = & -15 \end{array}$$

Write the equations in column form and subtract

Notice that the *n* variable eliminated

$\frac{-3m}{-3}=\frac{-15}{-3}$ Divide each side with -3

$m=5$ Simplify

Now substitute 5 for *m* in either equation to find the value of *n*.

$m+2n=23$ First equation

$5+2n=23 \quad m=5$

$5+2n-5=23-5$ Subtract 5 from each side

$2n=18$ Simplify

$\frac{2n}{2}=\frac{18}{2}$ Divide each side with 2

$n=9$ implify

The numbers are $\boxed{5 \text{ and } 9}$

Answer 34PA.

Let the number of motor vehicles produced by United States is *m* (in millions) and the number of motor vehicles produced by japan is *n* (in millions)

The United States produced 2 million more motor vehicles than Japan

That is $m = n + 2$ or $m - n = 2$ …… (1)

The total number of vehicles produced by the two countries is about 22 million

That is $m + n = 22$ …… (2)

Since the coefficients of the *m* terms, 1 and -1, are the additive inverses, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{lcccccc} & m & - & n & = & 2 \\ (+) & m & + & n & = & 22 \\ \hline & 2m & & & = & 24 \end{array}$$

Write the equations in column form and add

Notice that the n variable eliminated

$\frac{2m}{2} = \frac{24}{2}$ Divide each side with 2

$m = 12$ Simplify

Now substitute 12 for *m* in either equation to find the value of *n*.

$m + n = 22$ Second equation

$12 + n = 22 \quad m = 12$

$12 + n - 12 = 22 - 12$ Subtract 12 from each side

$n = 10$ Simplify

The number of motor vehicles produced by **United States** is **12 million** and the number of vehicles produced by **Japan** is **10 million**

Answer 35PA.

Let the amount paid by the adult for the van for his tour be $*m* and the amount paid by the student for the van for his tour be $*n*

Two adults and five students in one van paid $77 for Grand Avenue Tour of the Cave

That is $2m+5n=77$ ...... (1)

Two adults and seven students in one van paid $95 for Grand Avenue Tour of the Cave

That is $2m+7n=95$ ...... (2)

Since the coefficients of the *m* terms, 2 and 2, are the same, we can eliminate the *m* terms by subtracting the equations.

$$\begin{array}{rrrrrr} & 2m & + & 5n & = & 77 \\ (-) & 2m & + & 7n & = & 95 \\ \hline & & & -2n & = & -18 \end{array}$$

Write the equations in column form and subtract

Notice that the *m* variable eliminated

$\frac{-2n}{-2}=\frac{-18}{-2}$ Divide each side with -2

$n=9$ Simplify

Now substitute 9 for *n* in either equation to find the value of *m*.

$2m+7n=95$ Second equation

$2m+7(9)=95$ $n=9$

$2m+63=95$ Simplify

$2m+63-63=95-63$ Subtract 12 from each side

$2m=32$ Simplify

$\frac{2m}{2}=\frac{32}{2}$ Divide each side with 2

$m=16$ Simplify

The amount paid by the adult for the tour is **$16**

The amount paid by the student for the tour is **$9**

Answer 36PA.

Let the amount earned by the Dallas Cowboys is $\$m$ and the amount earned by the Deion Sanders is $\$n$

Troy Aikman, the quarterback for the Dallas Cowboys, earned $0.467 million more than Deion Sanders, the Cowboys cornerback.

That is $m-n=0.467$ ...... (1)

The total amount earned by Dallas Cowboys and Deion Sanders is $12.867 million

That is $m+n=12.867$ ...... (2)

Since the coefficients of the *n* terms, 1 and -1, are the additive inverse, we can eliminate the *n* terms by adding the equations.

$$\begin{array}{lccccc} & m & - & n & = & 0.467 \\ (+) & m & + & n & = & 12.867 \\ \hline & 2m & & & = & 13.334 \end{array}$$

Write the equations in column form and add

Notice that the n variable eliminated

$\frac{2m}{2}=\frac{13.334}{2}$ Divide each side with 2

$m=6.667$ Simplify

Now substitute 6.667 for *m* in either equation to find the value of *n*.

$m+n=12.867$ Second equation

$6.667+n=12.867 \quad n=9$

$6.667+n-6.667=12.867-6.667$ Subtract 6.667 from each side

$n=6.2$ Simplify

The amount earned by the Dallas Cowboys is **$6.667** and the amount earned by the Deion Sanders is **$6.2**

Answer 37PA.

Let *x* represent the number of years since 2000 and *y* represent population in billions.

The population of China is shown below:

	2000	2050
x (Since 2000)	0	50
y	1.28	1.52

The order pairs $(0,1.28)$ and $(50,1.52)$

The line equation passes through the points (x_1, y_1) and (x_2, y_2) is given by

$$y - y_1 = m(x - x_1),\quad m = \frac{y_2 - y_1}{x_2 - x_1} \quad \ldots\ldots (1)$$

Substitute $x_1 = 0, y_1 = 1.28, x_2 = 50, \text{and } y_2 = 1.52$ in the equation (1)

$$y - 1.28 = \frac{1.52 - 1.28}{50 - 0}(x - 0)$$

$y - 1.28 = \dfrac{0.24}{50}x$ Simplify

$y - 1.28 = 0.0048x$ Simplify

$y = 1.28 + 0.0048x$ Add 1.28 to each side of the equation

Hence the equation to represent the population of China is $\boxed{y = 1.28 + 0.0048x}$

Answer 38PA.

Let x represent the number of years since 2000 and y represent population in billions.

The population of India is shown below:

	2000	2050
x (Since 2000)	0	50
y	1.01	1.53

The order pairs $(0,1.01)$ and $(50,1.53)$

The line equation passes through the points (x_1, y_1) and (x_2, y_2) is given by

$$y - y_1 = m(x - x_1),\quad m = \frac{y_2 - y_1}{x_2 - x_1} \quad \ldots\ldots (1)$$

Substitute $x_1 = 0, y_1 = 1.01, x_2 = 50, \text{and } y_2 = 1.53$ in the equation (1)

$$y - 1.01 = \frac{1.53 - 1.01}{50 - 0}(x - 0)$$

$y - 1.01 = \dfrac{0.52}{50}x$ Simplify

$y - 1.01 = 0.0104x$ Simplify

$y = 1.01 + 0.0104x$ Add 1.01 to each side of the equation

Hence the equation to represent the population of India is $\boxed{y = 1.01 + 0.0104x}$

Answer 39PA.

Let *x* represent the number of years since 2000 and *y* represent population in billions.

The population of China is shown below:

	2000	2050
x (Since 2000)	0	50
y	1.28	1.52

The order pairs $(0,1.28)$ and $(50,1.52)$

The line equation passes through the points (x_1,y_1) and (x_2,y_2) is given by

$$y-y_1=m(x-x_1),\quad m=\frac{y_2-y_1}{x_2-x_1} \quad \ldots\ldots (1)$$

Substitute $x_1=0, y_1=1.28, x_2=50, \text{and } y_2=1.52$ in the equation (1)

$$y-1.28=\frac{1.52-1.28}{50-0}(x-0)$$

$$y-1.28=\frac{0.24}{50}x$$ Simplify

$$y-1.28=0.0048x$$ Simplify

$$y=1.28+0.0048x$$ Add 1.28 to each side of the equation

Hence the equation to represent the population of China is $y=1.28+0.0048x$

The population of India is shown below:

	2000	2050
x (Since 2000)	0	50
y	1.01	1.53

The order pairs $(0,1.01)$ and $(50,1.53)$

The line equation passes through the points (x_1, y_1) and (x_2, y_2) is given by

$$y - y_1 = m(x - x_1), \quad m = \frac{y_2 - y_1}{x_2 - x_1} \quad \ldots\ldots (2)$$

Substitute $x_1 = 0, y_1 = 1.01, x_2 = 50, \text{and } y_2 = 1.53$ in the equation (2)

$$y - 1.01 = \frac{1.53 - 1.01}{50 - 0}(x - 0)$$

$y - 1.01 = \frac{0.52}{50}x$ Simplify

$y - 1.01 = 0.0104x$ Simplify

$y = 1.01 + 0.0104x$ Add 1.01 to each side of the equation

Hence the equation to represent the population of India is $y = 1.01 + 0.0104x$

Suppose after x years the population in the China and the population in the India are equal

The equation to represent the population of China is $y = 1.28 + 0.0048x$ ...... (3)

The equation to represent the population of India is $y = 1.01 + 0.0104x$ ...... (4)

From the equations (3) and (4)

$1.28 + 0.0048x = 1.01 + 0.0104x$

$1.28 + 0.0048x - 0.0104x = 1.01 + 0.0104x - 0.0104x$

$1.28 - 0.0056x = 1.01$ Simplify

$1.28 - 0.0056x - 1.28 = 1.01 - 1.28$ Subtract 1.28 from each side

$-0.0056x = -0.27$ Simplify

$\frac{-0.0056x}{-0.0056} = \frac{-0.27}{-0.0056}$ Divide each side with -0.0056

$x \approx 48.2$ Simplify

Hence, after **48.2 years**, since 2000 the populations of China and India are equal.

That is in the year **2048**, the populations of China and India are equal.

Answer 40PA.

The equation $Ax + By = 15$ passes through the point $(2,1)$

Then, $A(2) + B(1) = 15$

$2A + B = 15$ ...... (1)

The equation $Ax - By = 9$ passes through the point $(2,1)$

Then, $A(2) - B(1) = 9$

$2A - B = 9$ ...... (2)

Since the coefficients of the B terms, -1 and 1, are additive inverses, we can eliminate the B terms by adding the equations.

$$\begin{array}{rrcrcr} & 2A & + & B & = & 15 \\ (+) & 2A & - & B & = & 9 \\ \hline & 4A & & & = & 24 \end{array}$$

Write the equations in column form and add

Notice that the B variable eliminated

$\frac{4A}{4} = \frac{24}{4}$ Divide each side with 4

$A = 6$ Simplify

Now substitute 6 for *A* in either equation to find the value of *B*.

$2A+B=15$ Second equation

$2(6)+B=15 \quad A=6$

$12+B=15$ Simplify

$12+B-12=15-12$ Subtract 12 from each side of the equation

$B=3$ Simplify

Hence, $\boxed{A=6 \text{ and } B=3}$

Answer 41PA.

An elimination method to solve the system of equations:

Step I: Write the two linear equations for the corresponding data

Step II: Identify the variables whose coefficients are additive inverses or the same and eliminate the variable. Solve the equation.

Step III: The value which we have got from the step II, substitute that value either of the equation to get the other value

On the winter solstice, there are fewer hours of daylight in the Northern Hemisphere than on any other day. On that day in Seward, Alaska, the difference between the number of hours of darkness n and the number of hours of daylight d is 12.

The following system of equations represents the situation.

$n+d=24$ ...... (1)

$n-d=12$ ...... (2)

Since the coefficients of the *d* terms, -1 and 1, are additive inverses, we can eliminate the *d* terms by adding the equations.

$$\begin{array}{lrcrcl} & n & + & d & = & 24 \\ (+) & n & - & d & = & 12 \\ \hline & 2n & & & = & 36 \end{array}$$

Write the equations in column form and add

Notice that the d variable eliminated

$\frac{2n}{2}=\frac{36}{2}$ Divide each side with 2

$n=18$ Simplify

Now substitute 18 for *n* in either equation to find the value of *d*.

$n + d = 24$ First equation

$18 + d = 24 \quad n = 18$

$18 + d - 18 = 24 - 18$ Subtract 18 from each side of the equation

$d = 6$ Simplify

Hence, the solution is $\boxed{(18, 6)}$

Answer 42PA.

Consider the equations,

$2x - 3y = -9$ ...... (1)

$3x - 3y = -12$ ...... (2)

Since the coefficients of the *y* terms, -3 and -3, are the same, we can eliminate the *y* terms by subtracting the equations.

$$\begin{array}{rrcrcr} & 2x & - & 3y & = & -9 \\ (-) & 3x & - & 3y & = & -12 \\ \hline & -x & & & = & 3 \end{array}$$

Write the equations in column form and subtract

Notice that the y variable eliminated

$\frac{-x}{-1} = \frac{3}{-1}$ Divide each side with -1

$x = -3$ Simplify

Now substitute -3 for *x* in either equation to find the value of *y*.

$3x - 3y = -12$ Second equation

$3(-3) - 3y = -12 \quad x = -3$

$-9 - 3y = -12$ Simplify

$-9 - 3y + 9 = -12 + 9$ Add 9 from each side of the equation

$-3y = -3$ Simplify

$\frac{-3y}{-3} = \frac{-3}{-3}$ Divide each side with -3

$y = 1$ Simplify

Notice that A is the value of *x* and C is the solution of the system of equations. However, the question asks for the value of *y*. The answer is **B**

Answer 43PA.

Consider the equations,

$4x+2y=8$ ...... (1)

$2x+2y=2$ ...... (2)

Since the coefficients of the *y* terms, 2 and 2, are the same, we can eliminate the *y* terms by subtracting the equations.

$$\begin{array}{rrrrrrr} & 4x & + & 2y & = & 8 \\ (-) & 2x & + & 2y & = & 2 \\ \hline & 2x & & & = & 6 \end{array}$$

Write the equations in column form and subtract

Notice that the y variable eliminated

$\frac{2x}{2}=\frac{6}{2}$ Divide each side with 2

$x=3$ Simplify

Now substitute 3 for *x* in either equation to find the value of *y*.

$2x+2y=2$ Second equation

$2(3)+2y=2$ $x=3$

$6+2y=2$ Simplify

$6+2y-6=2-6$ Subtract 6 from each side of the equation

$2y=-4$ Simplify

$\frac{2y}{2}=\frac{-4}{2}$ Divide each side with 2

$y=-2$ Simplify

Notice that B or C is the value of *x* and since *y* is the value of C, so the answer is **C**

Answer 44MYS.

Consider the equations,

$y = 5x$ ...... (1)

$x + 2y = 22$ ...... (2)

Since $y = 5x$, substitute $5x$ for y in the second equation

$x + 2(5x) = 22$

$x + 10x = 22$ Simplify

$11x = 22$ Combine like terms

$x = \frac{22}{11}$ Divide each side with 11

$x = 2$ Simplify

Use $y = 5x$ to find the value of y

$y = 5x$

$y = 5(2)$ $x = 2$

$y = 10$ Simplify

The solution is $\boxed{(2,10)}$

Answer 45MYS.

Consider the equations,

$x = 2y + 3$ ...... (1)

$3x + 4y = -1$ ...... (2)

Since $x = 2y + 3$, substitute $2y + 3$ for x in the second equation

$3(2y+3) + 4y = -1$

$6y + 9 + 4y = -1$ Use the Distributive Property

$10y + 9 = -1$ Combine like terms

$10y + 9 - 9 = -1 - 9$ Subtract 9 from each side

$10y = -10$ Simplify

$y = \frac{-10}{10}$ Divide each side with 10

$y = -1$ Simplify

Use $x = 2y + 3$ to find the value of y

$x = 2y + 3$

$x = 2(-1) + 3 \quad y = -1$

$x = -2 + 3$

$x = 1$ Simplify

The solution is $\boxed{(1, -1)}$

Answer 46MYS.

Consider the equations,

$2y-x=-5$ ...... (1)

$4y-3x=-1$ ...... (2)

Solve the first equation for *x* since the coefficient of *x* is -1

$2y-x=-5$ First equation

$2y-x+5=-5+5$ Add 5 to each side

$2y-x+5=0$ Simplify

$2y-x+5+x=0+x$ Add *x* to each side

$2y+5=x$ Simplify

$x=2y+5$

Since $x=2y+5$, substitute $2y+5$ for x in the second equation

$4y-3x=-1$ Second equation

$4y-3(2y+5)=-1$

$4y-6y-15=-1$ Use the Distributive Property

$-2y-15=-1$ Combine like terms

$-2y-15+15=-1+15$ Add 15 to each side

$-2y=14$ Simplify

$y=\frac{14}{-2}$ Divide each side with -2

$y=-7$ Simplify

Use $x=2y+5$ to find the value of x

$x=2y+5$

$x=2(-7)+5 \quad y=-7$

$x=-14+5$

$x=-9$ Simplify

The solution is $\boxed{(-9,-7)}$

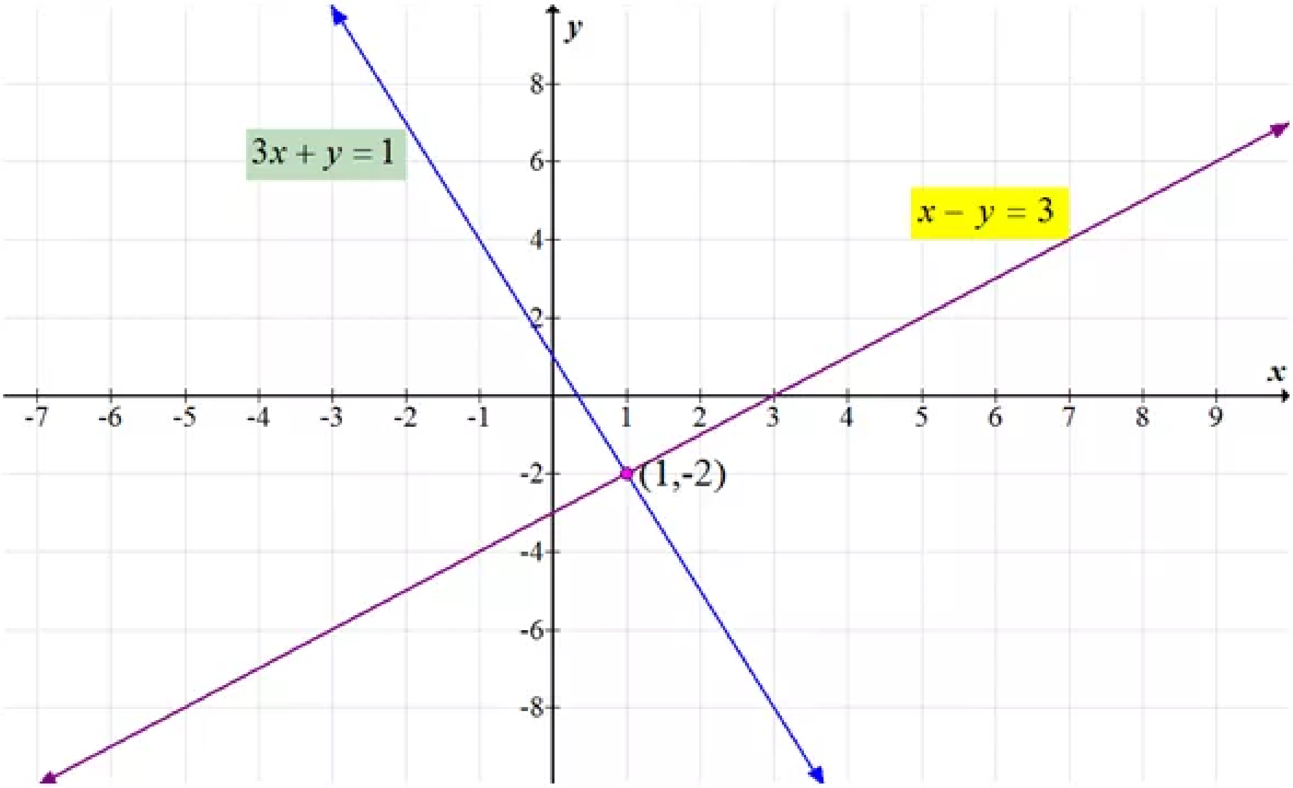
Answer 47MYS.

Consider the equations,

$x - y = 3$ ...... (1)

$3x + y = 1$ ...... (2)

The graph of the equations $x - y = 3$ and $3x + y = 1$ is shown in the below:



The graphs appear to intersect at the point with coordinates $(1, -2)$. Check this estimate by replacing *x* with 1 and *y* with -2 in each equation.

Check:

$$\begin{aligned} x - y &= 3 & 3x + y &= 1 \\ 1 - (-2) &= 3 & 3(1) + (-2) &= 1 \\ 1 + 2 &= 3 & 3 - 2 &= 1 \\ 3 &= 3 & 1 &= 1 \end{aligned}$$

Hence, the solution to the equation is $\boxed{(1, -2)}$

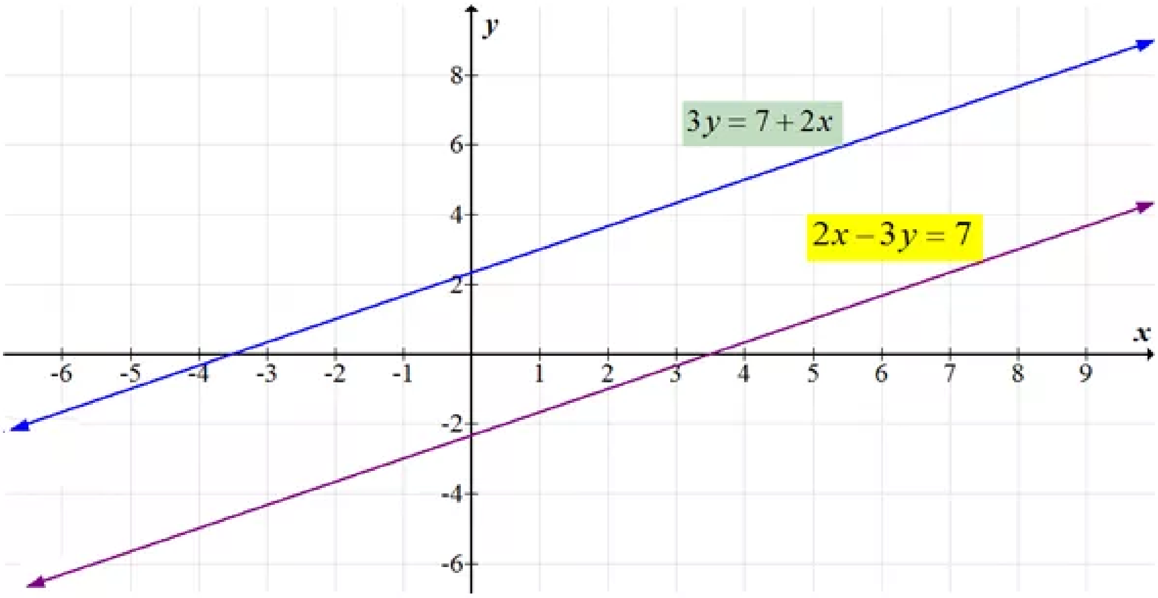
Answer 48MYS.

Consider the equations,

$2x-3y=7$ ...... (1)

$3y=7+2x$ ...... (2)

The graph of the equations $2x-3y=7$ and $3y=7+2x$ is shown in the below:



The graphs of the equations are parallel lines. Since they do not intersect, there are **no solutions** to this system of equations.

Notice that the lines have same slope but different *y* intercepts.

Answer 49MYS.

Consider the equations,

$4x+y=12$ ...... (1)

$x=3-\frac{1}{4}y$ ...... (2)

Consider the equation (2)

$$x=3-\frac{1}{4}y$$

$x\times 4=\left(3-\frac{1}{4}y\right)4$ Multiply each side with 4

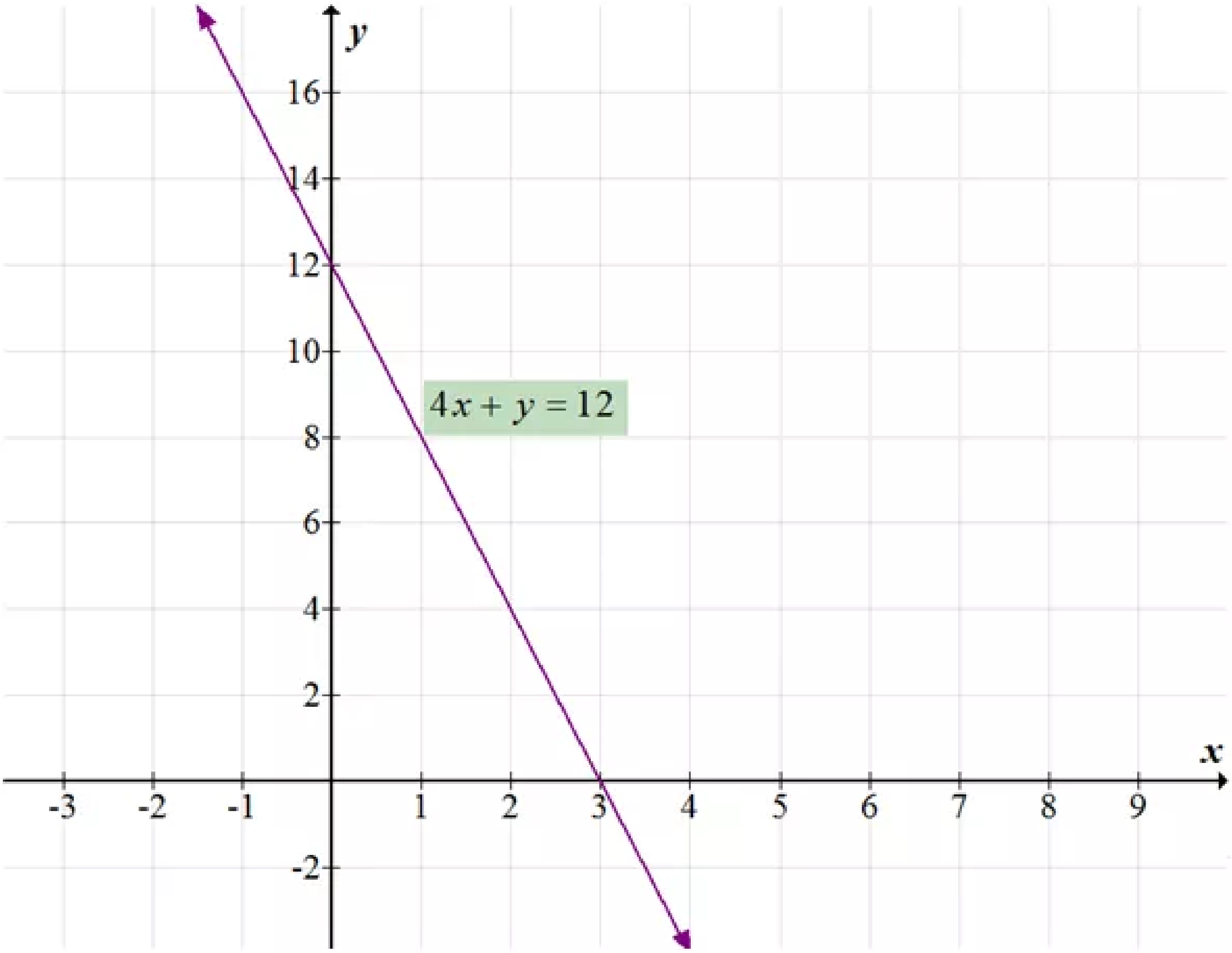
$4x=12-y$ Simplify

$4x+y=12-y+y$ Add *y* to each side of the equation

$4x+y=12$ Simplify

This is same as the equation (1)

The graph of the equations $4x + y = 12$ and $x = 3 - \frac{1}{4}y$ is shown in the below:



The graphs of the equations are same. So, there are **infinitely many solutions** to the system of equations.

Answer 50MYS.

Consider the equation,

$$y = \frac{5}{4}x - 3 \text{ ...... (1)}$$

The equation (1) is compared with $y = mx + c$, m is the slope of the line and c is the y intercept.

Let the required line equation be $y = ax + b$ ...... (2)

The required equation passes through origin $(0,0)$

Substitute $x = 0$ and $y = 0$ in the equation (2)

$$y = ax + b$$
$$(0) = a(0) + b$$
$$0 = 0 + b$$
$$0 = b$$

Substitute $b = 0$ in the equation (2), $y = ax$

Since the required line parallel to $y = \frac{5}{4}x - 3$, so the slope of the required line is $a = \frac{5}{4}$

Substitute $a = \frac{5}{4}$ in the equation (3)

Then the equation is $\boxed{y = \frac{5}{4}x}$

Answer 51MYS.

Consider the expression,

$$2(3x + 4y)$$

$2(3x + 4y) = 2 \cdot 3x + 2 \cdot 4y$ Use the Distributive Property

$= 6x + 8y$ Simplify

Hence, $2(3x + 4y) = \boxed{6x + 8y}$

Answer 52MYS.

Consider the expression,

$6(2a-5b)$

$6(2a-5b)=6\cdot 2a-6\cdot 5b$ Use the Distributive Property

$=12a-30b$ Simplify

Hence, $6(2a-5b)=\boxed{12a-30b}$

Answer 53MYS.

Consider the expression,

$-3(-2m+3n)$

$-3(-2m+3n)=-3\cdot -2m-3\cdot 3n$ Use the Distributive Property

$=6m-9n$ Simplify

Hence, $-3(-2m+3n)=\boxed{6m-9n}$

Answer 54MYS.

Consider the expression,

$-5(4t-2s)$

$-5(4t-2s)=-5\cdot 4t-5\cdot -2s$ Use the Distributive Property

$=-20t+10s$ Simplify

Hence, $-5(4t-2s)=\boxed{-20t+10s}$