Chapter 5. Analyzing Linear Equations

Ex. 5.4

Answer 1CU.

Need to compare and contrast the process used to write an equation given the slope and one point with the process used for two points

For writing an equation of a line that passes through one point and the slope we follow the given procedure

Consider the point and the slope

$(3,0)$ and $m=-2$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope -2

To find the y-intercept, replace m with -2 and (x,y) with $(3,0)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$0=-2(3)+b$	Replace m with $-2, y$ with 0 and x with 3
$0=-6+b$	Multiply
$b=6$	Adding -6 on both sides

Now write the slope intercept form using $m=-2$ and $b=6$

$y=mx+b$	Slope-intercept form
$y=-2x+6$	Replace m with -2 and b with 6

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=-2x+6}$.

This is the process for finding an equation of a line when the slope and one point is given

For writing an equation of a line that passes through given two points we follow the following procedure

Consider the two points $(x_1,y_1)=(-3,-1)$ and $(x_2,y_2)=(6,-4)$

First finding the slope of the line containing the points through (x_1,y_1) and (x_2,y_2) is given by

$m=\frac{y_2-y_1}{x_2-x_1}$	Slope formulae
$=\frac{-4-(-1)}{6-(-3)}$	Replace $x_1=-3, x_2=6, y_1=-1, y_2=-4$
$=\frac{-4+1}{6+3}$	Simplify
$=-\frac{1}{3}$	

Next you know the slope and two points then choose one point and find the y-intercept. In this case we chose $(6,-4)$

$y = mx + b$ Slope-intercept form

$-4 = -\frac{1}{3}(6) + b$ Replace m with $-\frac{1}{3}$, x with 6 and y with -4

$-4 = -2 + b$ Multiply

$b = -2$ Adding 2 each side

Next write the slope-intercept form using $m = -\frac{1}{3}$ and $b = -2$

$y = mx + b$ Slope-intercept form

$y = -\frac{1}{3}x - 2$ Replace m with $-\frac{1}{3}$ and b by -2

Therefore the equation is $\boxed{y = -\frac{1}{3}x - 2}$

Thus the process for the given two points for finding an equation of a line.

Answer 2CU.

Need to write an equation in slope-intercept form of a line that has a y-intercept of 3

Slope-intercept form equation is in the form of $y = mx + b$

Here m is slope of the equation of a line

And b is the y-intercept of a line

Given that the line has a y-intercept of 3

So substituting $b = 3$ in $y = mx + b$

$y = mx + b$

$y = mx + 3$ Given y-intercept is 3

Hence the required equation of a line that has a y-intercept of 3 is $\boxed{y = mx + 3}$.

Need to explain that you can write an equation of a line given x- and y-intercepts whether the statement is sometimes, always, or never true

Equation of a line is in the form of $y = mx + b$

Here m is the slope of the line passing through the points

And b is the y-intercept

It possible for writing a equation of a line given x- and y- intercepts. For x-intercept we take the point as $(x, 0)$ and for the y-intercept we take the point as $(0, y)$

From these we can find the equation of a line

But it is not possible for finding the equation of a line when the both x and y intercepts are zero. So we are unable to write the equation of the graph or a line

Thus $\boxed{\text{Sometimes}}$, if the x and y-intercepts both are zero, then we cannot able to write the equation of a line.

Answer 4CU.

Consider the point and the slope

$(4, -2)$ and $m = 2$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope 2

To find the y-intercept, replace m with 2 and (x, y) with $(4, -2)$ in the slope-intercept form

Then solve for b

$y = mx + b$	Slope-intercept form
$-2 = 2(4) + b$	Replace m with 2, y with -2 and x with 4
$-2 = 8 + b$	Multiply
$b = -10$	Adding -8 on both sides

Now write the slope intercept form using $m = 2$ and $b = -10$

$y = mx + b$	Slope-intercept form
$y = 2x - 10$	Replace m with 2 and b with -10

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y = 2x - 10}$.

Answer 5CU.

Consider the point and the slope

$(3,7)$ and $m=-3$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope -3

To find the y-intercept, replace m with -3 and (x,y) with $(3,7)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$7=-3(3)+b$	Replace m with -3, y with 7 and x with 3
$7=-9+b$	Multiply
$b=16$	Adding 9 on both sides

Now write the slope intercept form using $m=-3$ and $b=16$

$y=mx+b$	Slope-intercept form
$y=-3x+16$	Replace m with -3 and b with 16

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=-3x+16}$.

Answer 6CU.

Consider the point and the slope

$(-3,5)$ and $m=-1$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope -1

To find the y-intercept, replace m with -1 and (x,y) with $(-3,5)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$5=-1(-3)+b$	Replace m with -1, y with 5 and x with -3
$5=3+b$	Multiply
$b=2$	Adding -3 on both sides

Now write the slope intercept form using $m=-1$ and $b=2$

$y=mx+b$ Slope-intercept form

$y=-1x+10$ Replace m with -1 and b with 10

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=-x+10}$.

Answer 7CU.

Consider the equation $(5,1),(8,-2)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(5,1)$ and $(x_2,y_2)=(8,-2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{-2-1}{8-5}$$ Let $x_1=5, y_1=1, x_2=8$ and $y_2=-2$

$$=\frac{-3}{3}$$

$$=-1$$

Next choose one point $(5,1)$ and find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$1=-1(5)+b$ Replace m with $-1, x$ by 5 and y with 1

$1=-5+b$ Multiply

$1+5=5-5+b$ Adding 5 on both sides

$b=6$

Write the slope-intercept form using $m=-1$ and $b=6$

$y=mx+b$

$y=(-1)x+(6)$ Replace m with -1 and b with 6

$y=-x+6$

Therefore the required equation is $\boxed{y=-x+6}$

Check your result by substituting the coordinates of the point not chosen, $(5,1)$, into the equation

$y=-x+6$

$5=-1+6$ Replace y with 5 and x with -1

$5=5$

Hence the required equation of the line is $\boxed{y=-x+6}$

Answer 8CU.

Consider the equation $(6,0),(0,4)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(6,0)$ and $(x_2,y_2)=(0,4)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{4-0}{0-6}$$ Let $x_1=6, y_1=0, x_2=0$ and $y_2=4$

$$=\frac{-4}{6}$$

$$=-\frac{2}{3}$$

Next choose one point $(6,0)$ and find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$0=-\frac{2}{3}(6)+b$ Replace m with $-\frac{2}{3}$, x by 6 and y with 0

$0=-4+b$ Multiply

$0+4=4-4+b$ Adding 4 on both sides

$b=4$

Write the slope-intercept form using $m=-\frac{2}{3}$ and $b=4$

$y=mx+b$

$y=\left(-\frac{2}{3}\right)x+(4)$ Replace m with $-\frac{2}{3}$ and b with 4

$y=-\frac{2}{3}x+4$

Therefore the required equation is $\boxed{y=-\frac{2}{3}x+4}$

Check your result by substituting the coordinates of the point not chosen, $(6,0)$ into the equation

$y=-\frac{2}{3}x+4$

$0=-\frac{2}{3}(6)+4$ Replace y with 0 and x with 6

$0=-4+4$

$0=0$

Hence the required equation of the line is $\boxed{y=-\frac{2}{3}x+4}$.

Answer 9CU.

Consider the equation $(5,2),(-7,-4)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(5,2)$ and $(x_2,y_2)=(-7,-4)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{-4-2}{-7-5}$$ Let $x_1=5, y_1=2, x_2=-7$ and $y_2=-4$

$$=\frac{-6}{-12}$$

$$=\frac{1}{2}$$

Next choose one point $(5,2)$ and find the y-intercept form of the line

$$y=mx+b$$ Slope-intercept form

$$2=\frac{1}{2}(5)+b$$ Replace m with $\frac{1}{2}$, x by 5 and y with 2

$$2=\frac{5}{2}+b$$ Multiply

$$2-\frac{5}{2}=-\frac{5}{2}+\frac{5}{2}+b$$ Adding $-\frac{5}{2}$ on both sides

$$b=-\frac{1}{2}$$

Write the slope-intercept form using $m=\frac{1}{2}$ and $b=-\frac{1}{2}$

$$y=mx+b$$

$$y=\left(\frac{1}{2}\right)x+\left(-\frac{1}{2}\right)$$ Replace m with $\frac{1}{2}$ and b with $-\frac{1}{2}$

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

Therefore the required equation is $y=\frac{1}{2}x-\frac{1}{2}$

Check your result by substituting the coordinates of the point not chosen, $(5,2)$ into the equation

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

$$2=\frac{1}{2}(5)-\frac{1}{2}$$ Replace y with 2 and x with 5

$$2=\frac{4}{2}$$

$$2=2$$

Hence the required equation of the line is $\boxed{y=\frac{1}{2}x-\frac{1}{2}}$.

Answer 10CU.

Consider the table of ordered pairs shows the coordinates of the two points on the graph of a line

x	y
-5	2
0	7

Need to find the equation describes the line that which option is correct

$a)y=x+7$ $b)y=x-7$

$c)y=-5x+7$ $d)y=5x+2$

Consider the equation $(-5,2),(0,7)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(-5,2)$ and $(x_2,y_2)=(0,7)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{7-2}{0-(-5)}$$ Let $x_1=-5, y_1=2, x_2=0$ and $y_2=7$

$$=\frac{5}{5}$$

$$=1$$

Next choose one point $(-5,2)$ and $m=1$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$2=1(-5)+b$ Replace m with $1, x$ by -5 and y with 2

$2=-5+b$ Multiply

$2+5=-5+5+b$ Adding 5 on both sides

$b=7$

Write the slope-intercept form using $m=1$ and $b=7$

$y=mx+b$

$y=(1)x+(7)$ Replace m with 1 and b with 7

$y=x+7$

Therefore the required equation is $y=x+7$

Check your result by substituting the coordinates of the point not chosen, $(-5,2)$ into the equation

$y=x+7$

$2=-5+7$ Replace x with -5 and y with 2

$2=2$

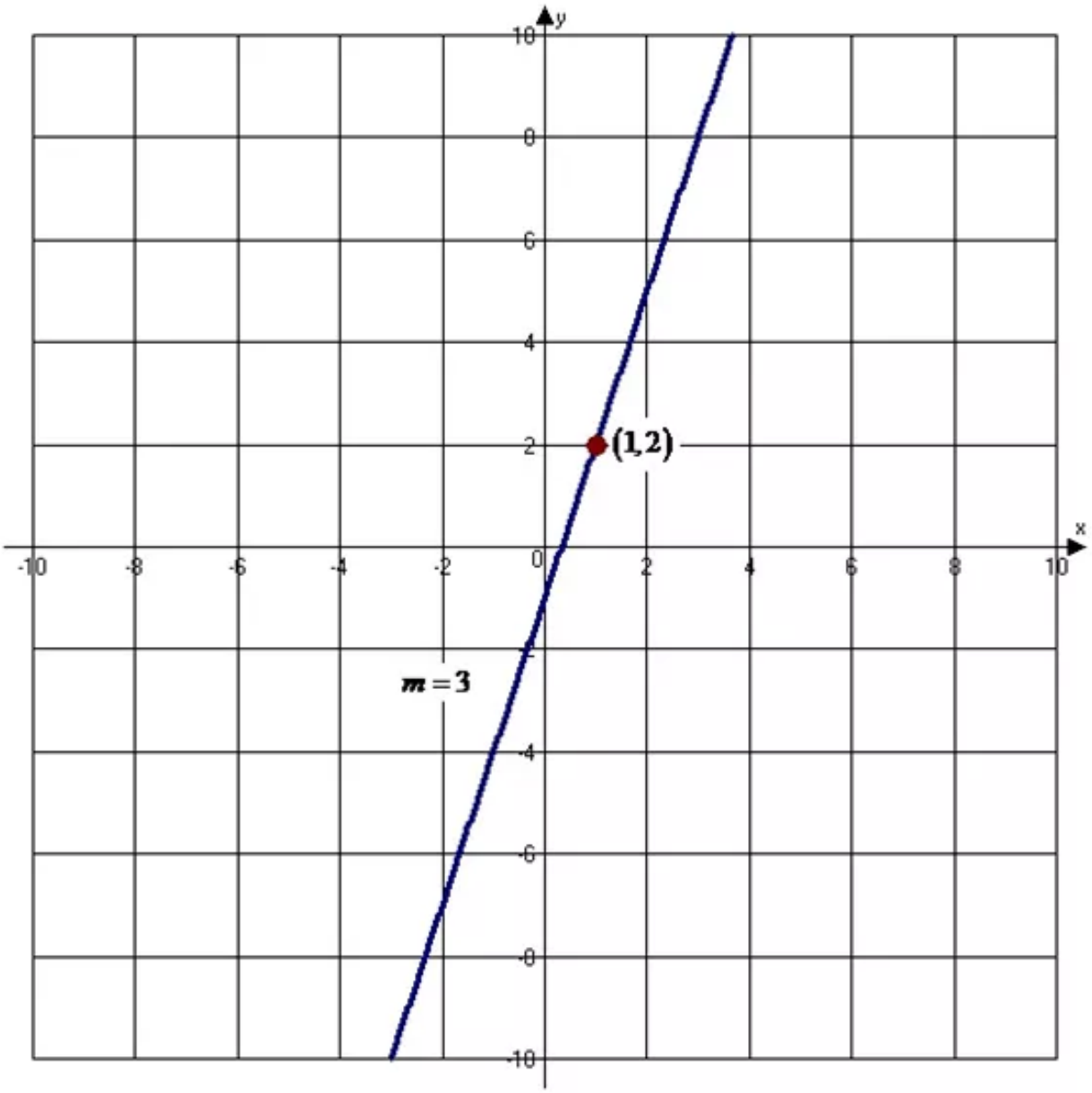
Hence the required equation of the line is $\boxed{y=x+7}$.

Hence it matches the option A

So the correct equation that describes the line is $\boxed{\text{A}}$.

Answer 11PA.

Consider the graph



Consider the point and the slope

$(1,2)$ and $m=3$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope 3

To find the y-intercept, replace m with 3 and (x,y) with $(1,2)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$2=1(3)+b$	Replace m with 1, y with 2 and x with 3
$2=3+b$	Multiply
$b=-1$	Adding -3 on both sides

Now write the slope intercept form using $m=3$ and $b=-1$

$y=mx+b$ Slope-intercept form

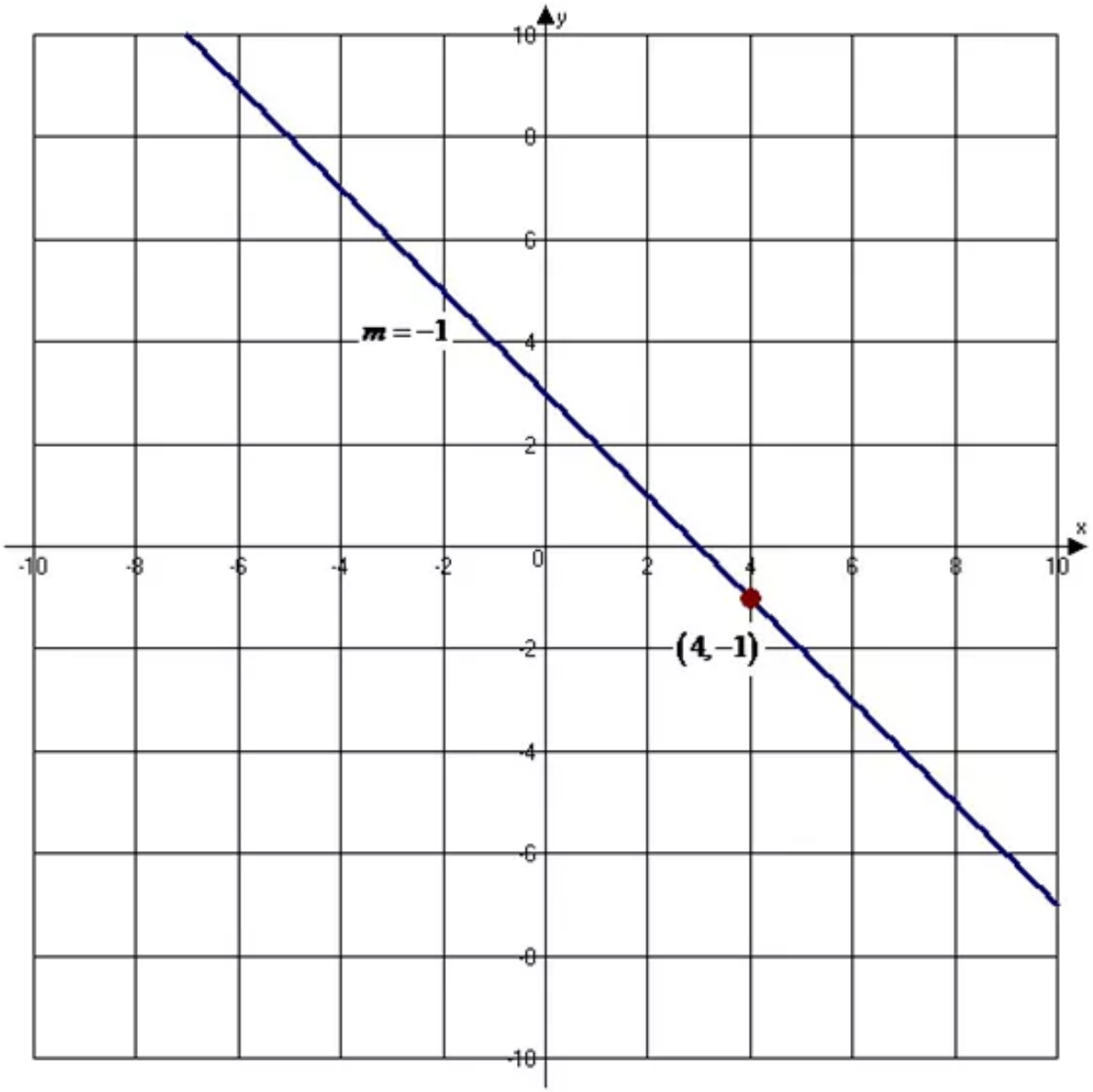
$y=3x+(-1)$ Replace m with 3 and b with -1

$y=3x-1$

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=3x-1}$.

Answer 12PA.

Consider the graph



Consider the point and the slope

$(4,-1)$ and $m=-1$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope -1

To find the y-intercept, replace m with -1 and (x,y) with $(4,-1)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$-1=-1(4)+b$	Replace m with -1, y with -1 and x with 4
$-1=-4+b$	Multiply
$b=3$	Adding -4 on both sides

Now write the slope intercept form using $m=-1$ and $b=3$

$y=mx+b$	Slope-intercept form
$y=-1x+(3)$	Replace m with -1 and b with 3
$y=-x+3$	

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=-x+3}$.

Answer 13PA.

Consider the point and the slope

$(5,-2)$ and $m=3$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope 3

To find the y-intercept, replace m with 3 and (x,y) with $(5,-2)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$-2=3(5)+b$	Replace m with 3, y with -2 and x with 5
$-2=15+b$	Multiply
$b=-17$	Adding -15 on both sides

Now write the slope intercept form using $m=3$ and $b=-17$

$y=mx+b$	Slope-intercept form
$y=3x-17$	Replace m with 3 and b with -17

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=3x-17}$.

Answer 14PA.

Consider the point and the slope

$(5,4)$ and $m=-5$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope -5

To find the y-intercept, replace m with -5 and (x,y) with $(5,4)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$4=-5(5)+b$	Replace m with -5, y with 4 and x with 5
$4=-25+b$	Multiply
$b=29$	Adding -4 on both sides

Now write the slope intercept form using $m=-5$ and $b=29$

$y=mx+b$	Slope-intercept form
$y=-5x+29$	Replace m with -5 and b with 29

Thus the required equation of a line that passes through the given point and the slope is $\boxed{y=-5x+29}$.

Answer 15PA.

Consider the point and the slope

$(3,0)$ and $m=-2$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope -2

To find the y-intercept, replace m with -2 and (x,y) with $(3,0)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$0=-2(3)+b$	Replace m with -2, y with 0 and x with 3
$0=-6+b$	Multiply
$b=6$	Adding -6 on both sides

Now write the slope intercept form using $m=-2$ and $b=6$

$y=mx+b$	Slope-intercept form
$y=-2x+6$	Replace m with -2 and b with 6

Thus the required equation of a line that passes through the given point and the slope is

$\boxed{y=-2x+6}$.

Answer 16PA.

Consider the point and the slope

$(5,3)$ and $m=\frac{1}{2}$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope $\frac{1}{2}$

To find the y-intercept, replace m with $\frac{1}{2}$ and (x,y) with $(5,3)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$3=\frac{1}{2}(5)+b$	Replace m with $\frac{1}{2}$, y with 3 and x with 5
$3=2.5+b$	Simplify
$b=0.5$	Adding -2.5 on both sides

Now write the slope intercept form using $m=\frac{1}{2}$ and $b=0.5$

$y=mx+b$	Slope-intercept form
$y=\frac{1}{2}x+0.5$	Replace m with $\frac{1}{2}$ and b with 0.5

Thus the required equation of a line that passes through the given point and the slope is

$\boxed{y=\frac{1}{2}x+0.5}$.

Answer 17PA.

Consider the point and the slope

$(-3,-1)$ and $m=-\frac{2}{3}$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope $-\frac{2}{3}$

To find the y-intercept, replace m with $-\frac{2}{3}$ and (x,y) with $(-3,-1)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$-1=-\frac{2}{3}(-3)+b$	Replace m with $-\frac{2}{3}$, y with -1 and x with -3
$-1=-2(-1)+b$	Simplify
$-1=2+b$	
$b=-3$	Adding -2 on both sides

Now write the slope intercept form using $m=-\frac{2}{3}$ and $b=-3$

$y=mx+b$	Slope-intercept form
$y=-\frac{2}{3}x-3$	Replace m with $-\frac{2}{3}$ and b with -3

Thus the required equation of a line that passes through the given point and the slope is

$\boxed{y=-\frac{2}{3}x-3}$.

Answer 18PA.

Consider the point and the slope

$(-3,-5)$ and $m=-\frac{5}{3}$

Need to write an equation of the line that passes through each point with the given slope

Here the line has slope $-\frac{5}{3}$

To find the y-intercept, replace m with $-\frac{5}{3}$ and (x,y) with $(-3,-5)$ in the slope-intercept form

Then solve for b

$y=mx+b$	Slope-intercept form
$-5=-\frac{5}{3}(-3)+b$	Replace m with $-\frac{5}{3}$, y with -5 and x with -3
$-5=-5(-1)+b$	Simplify
$-5=5+b$	
$b=-10$	Adding -5 on both sides

Now write the slope intercept form using $m=-\frac{5}{3}$ and $b=-10$

$y=mx+b$ Slope-intercept form

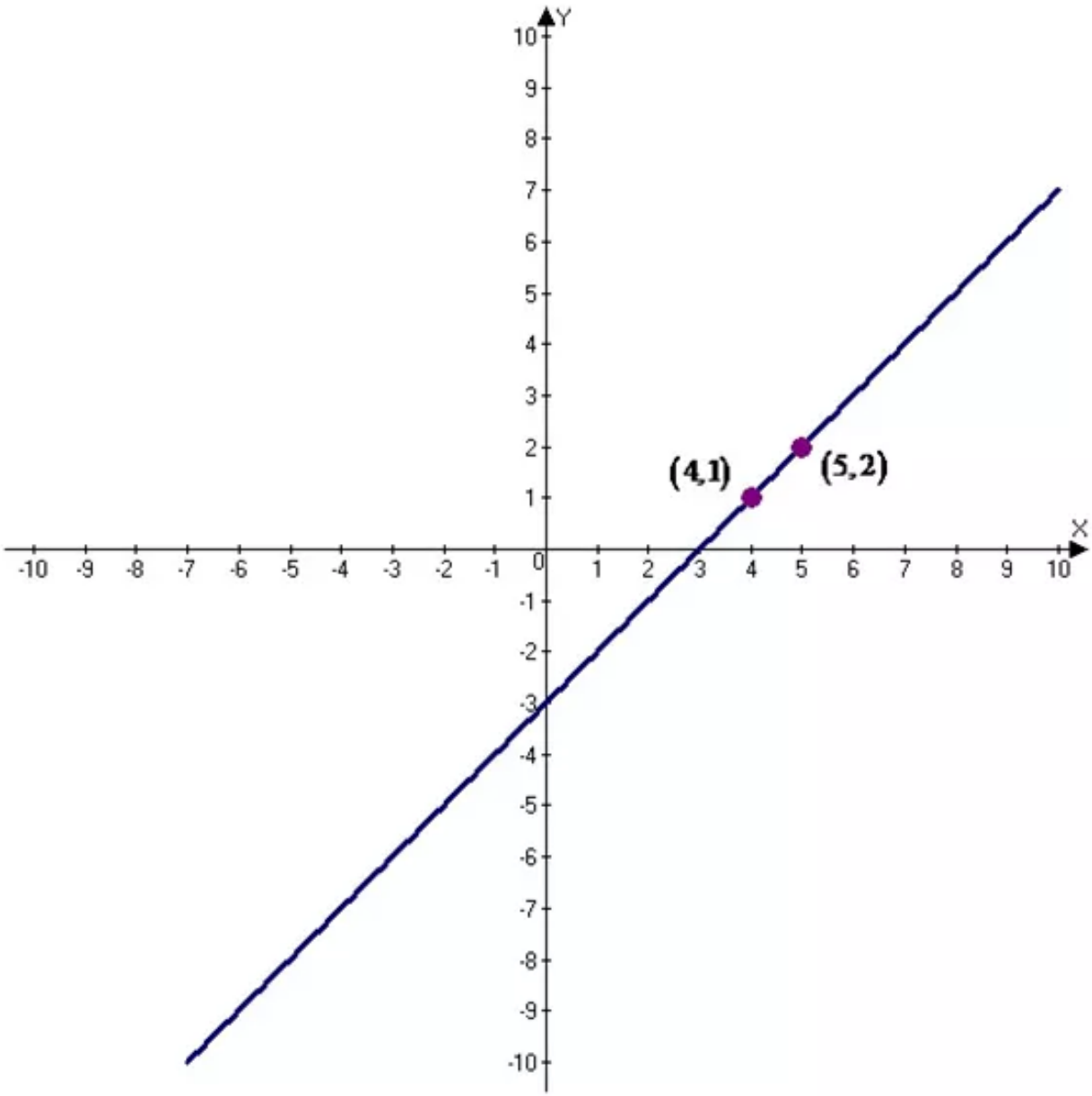
$y=-\frac{5}{3}x-10$ Replace m with $-\frac{5}{3}$ and b with -10

Thus the required equation of a line that passes through the given point and the slope is

$$\boxed{y=-\frac{5}{3}x-10}.$$

Answer 19PA.

Consider the graph of a line that passes through the point is shown below



Need to write an equation of the line that passes through each pair of points

Consider the equation $(5,2),(4,1)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(4,1)$ and $(x_2,y_2)=(5,2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{2-1}{5-4}$$ Let $x_1=4, y_1=1, x_2=5$ and $y_2=2$

$$=\frac{1}{1}$$

$$=1$$

Next choose one point $(5,2)$ and $m=1$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$2=1(5)+b$ Replace m with $1, x$ by 5 and y with 2

$2=5+b$ Multiply

$2-5=-5+5+b$ Adding -5 on both sides

$b=-3$

Write the slope-intercept form using $m=1$ and $b=-3$

$y=mx+b$

$y=(1)x+(-3)$ Replace m with 1 and b with -3

$y=x-3$

Therefore the required equation is $\boxed{y=x-3}$

Check your result by substituting the coordinates of the point not chosen, $(5,2)$ into the equation

$y=x-3$

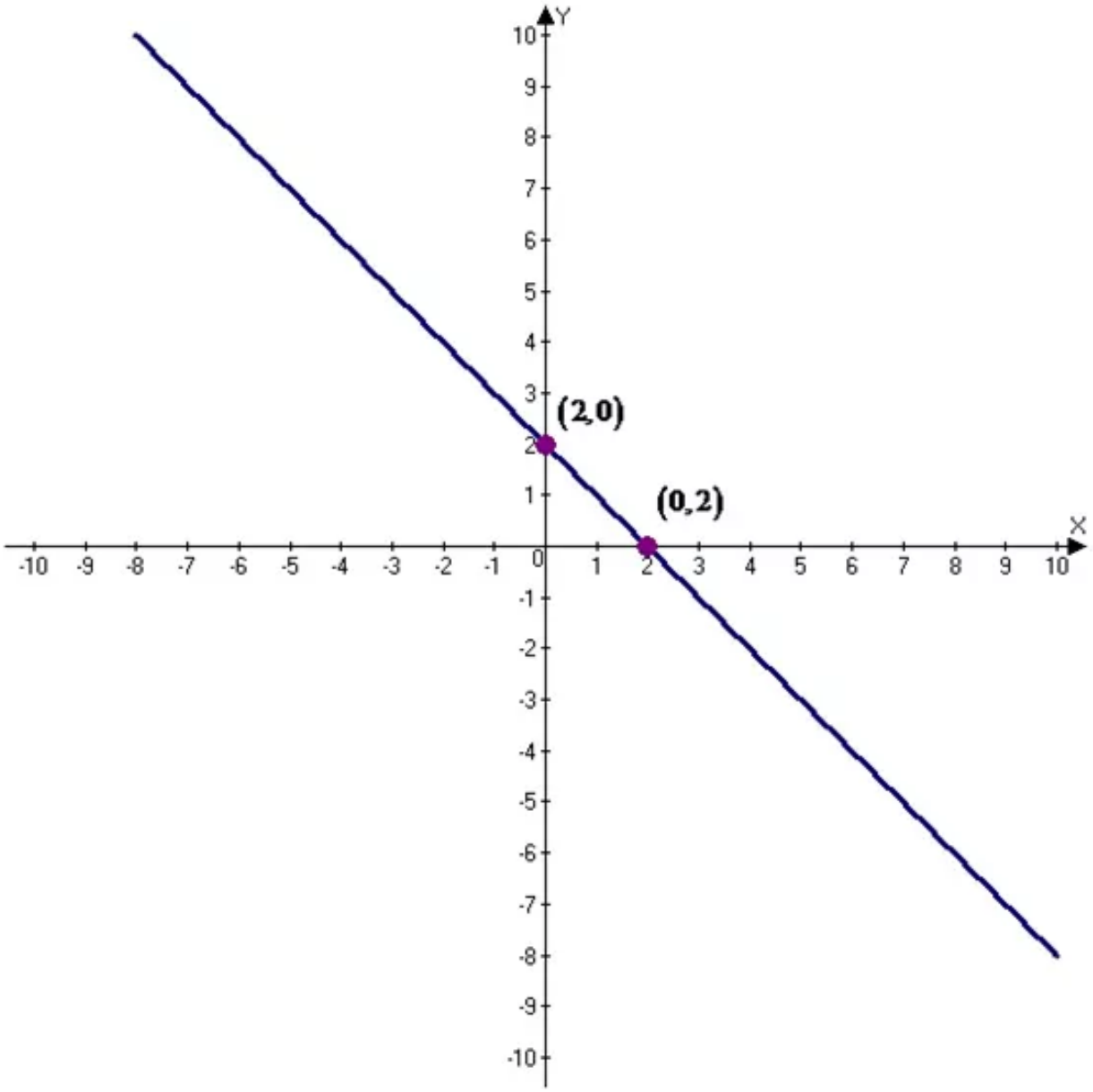
$2=5-3$ Replace x with 5 and y with 2

$2=2$

Hence the required equation of the line is $\boxed{y=x-3}$.

Answer 20PA.

Consider the graph of a line that passes through the point is shown below



Need to write an equation of the line that passes through each pair of points

Consider the equation $(2,0)$ and $(0,2)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(2,0)$ and $(x_2,y_2)=(0,2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{2-0}{0-2}$$ Let $x_1=2, y_1=0, x_2=0$ and $y_2=2$

$$=\frac{2}{-2}$$

$$=-1$$

Next choose one point $(2,0)$ and $m=-1$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$0=-1(2)+b$ Replace m with $-1, x$ by 2 and y with 0

$0=-2+b$ Multiply

$0+2=2-2+b$ Adding 2 on both sides

$b=2$

Write the slope-intercept form using $m=-1$ and $b=2$

$y=mx+b$

$y=(-1)x+(2)$ Replace m with -1 and b with 2

$y=-x+2$

Therefore the required equation is $y=-x+2$

Check your result by substituting the coordinates of the point not chosen, $(2,0)$ into the equation

$y=-x+2$

$0=-2+2$ Replace x with -2 and y with 0

$0=0$

Hence the required equation of the line is $\boxed{y=-x+2}$.

Answer 21PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(4,2)$ and $(-2,-4)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(4,2)$ and $(x_2,y_2)=(-2,-4)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{-4-2}{-2-4}$$ Let $x_1=4, y_1=2, x_2=-2$ and $y_2=-4$

$$=\frac{-6}{-6}$$

$$=1$$

Next choose one point $(4,2)$ and $m=1$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$2=1(4)+b$ Replace m with 1, x by 4 and y with 2

$2=4+b$ Multiply

$2-4=-4+4+b$ Adding -4 on both sides

$b=-2$

Write the slope-intercept form using $m=1$ and $b=-2$

$y=mx+b$

$y=(1)x+(-2)$ Replace m with 1 and b with -2

$y=x-2$

Therefore the required equation is $\boxed{y=x-2}$

Check your result by substituting the coordinates of the point not chosen, $(4,2)$ into the equation

$y=x-2$

$2=4-2$ Replace x with 4 and y with 2

$2=2$

Hence the required equation of the line is $\boxed{y=x-2}$.

Answer 22PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(3,-2)$ and $(6,4)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(3,-2)$ and $(x_2,y_2)=(6,4)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{4-(-2)}{6-3}$$ Let $x_1=3, y_1=-2, x_2=6$ and $y_2=4$

$$=\frac{6}{3}$$

$$=2$$

Next choose one point $(3,-2)$ and $m=2$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$-2=2(3)+b$ Replace m with $2, x$ by 3 and y with -2

$-2=6+b$ Multiply

$-2-6=-6+6+b$ Adding -6 on both sides

$b=-8$

Write the slope-intercept form using $m=2$ and $b=-8$

$y=mx+b$

$y=(2)x+(-8)$ Replace m with 2 and b with -8

$y=2x-8$

Therefore the required equation is $\boxed{y=2x-8}$

Check your result by substituting the coordinates of the point not chosen, $(2,-2)$ into the equation

$y=2x-8$

$-2=2(3)-8$ Replace x with 3 and y with -2

$-2=6-8$

$-2=-2$

Hence the required equation of the line is $\boxed{y=2x-8}$.

Answer 23PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(-1,3)$ and $(2,-3)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(-1,3)$ and $(x_2,y_2)=(2,-3)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{-3-3}{2-(-1)}$$ Let $x_1=-1, y_1=3, x_2=2$ and $y_2=-3$

$$=\frac{-6}{3}$$

$$=-2$$

Next choose one point $(-1,3)$ and $m=-2$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$3=-2(-1)+b$ Replace m with $-2, x$ by -1 and y with 3

$3=2+b$ Multiply

$b=1$ Adding 6 on both sides

Write the slope-intercept form using $m=-2$ and $b=1$

$y=mx+b$

$y=(-2)x+(1)$ Replace m with -2 and b with 5

$y=-2x+1$

Therefore the required equation is $\boxed{y=-2x+1}$

Check your result by substituting the coordinates of the point not chosen, $(-1,3)$ into the equation

$y=-2x+1$

$3=-2(-1)+1$ Replace x with 3 and y with -1

$3=2+1$ Multiply

$3=3$

Hence the required equation of the line is $\boxed{y=-2x+1}$.

Answer 24PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(2,-2)$ and $(3,2)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(2,-2)$ and $(x_2,y_2)=(3,2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{2-(-2)}{3-(2)}$$ Let $x_1=2, y_1=-2, x_2=3$ and $y_2=2$

$$=\frac{4}{1}$$

$$=4$$

Next choose one point $(2,-2)$ and $m=4$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$-2=4(2)+b$ Replace m with $4, x$ by 2 and y with -2

$-2=8+b$ Multiply

$b=-10$ Adding -8 on both sides

Write the slope-intercept form using $m=4$ and $b=-10$

$y=mx+b$

$y=(4)x+(-10)$ Replace m with 4 and b with -10

$y=4x-10$

Therefore the required equation is $\boxed{y=4x-10}$

Check your result by substituting the coordinates of the point not chosen, $(2,-2)$ into the equation

$y=4x-10$

$-2=4(2)-10$ Replace x with 2 and y with -2

$-2=8-10$ Multiply

$-2=-2$

Hence the required equation of the line is $\boxed{y=4x-10}$.

Answer 25PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(7,-2)$ and $(-4,-2)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(7,-2)$ and $(x_2,y_2)=(-4,-2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{-2-(-2)}{-4-(7)}$$ Let $x_1=7, y_1=-2, x_2=-4$ and $y_2=-2$

$$=\frac{0}{-11}$$

$$=0$$

Next choose one point $(7,-2)$ and $m=0$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$-2=7(0)+b$ Replace m with $7, x$ by 0 and y with -2

$-2=0+b$ Multiply

$b=-2$

Write the slope-intercept form using $m=0$ and $b=-2$

$y=mx+b$

$y=(0)x+(-2)$ Replace m with 0 and b with -2

$y=0-2$

$y=-2$

Therefore the required equation is $\boxed{y=-2}$

Check your result by substituting the coordinates of the point not chosen, $(7,-2)$ into the equation

$y=-2$

$-2=-2$ Replace y with -2

$-2=-2$

Hence the required equation of the line is $\boxed{y=-2}$.

Answer 26PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(0,5)$ and $(-3,5)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(0,5)$ and $(x_2,y_2)=(-3,5)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{5-(5)}{-3-0}$$ Let $x_1=0, y_1=5, x_2=-3$ and $y_2=5$

$$=\frac{0}{-3}$$

$$=0$$

Next choose one point $(0,5)$ and $m=0$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$5=0(0)+b$ Replace m with $0, x$ by 0 and y with 5

$5=0+b$ Multiply

$b=5$

Write the slope-intercept form using $m=0$ and $b=5$

$y=mx+b$

$y=(0)x+(5)$ Replace m with 0 and b with 5

$y=0+5$

$y=5$

Therefore the required equation is $\boxed{y=5}$

Check your result by substituting the coordinates of the point not chosen, $(0,5)$ into the equation

$y=5$

$5=5$ Replace y with 5

Hence the required equation of the line is $\boxed{y=5}$.

Answer 27PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(1,1)$ and $(7,4)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(1,1)$ and $(x_2,y_2)=(7,4)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{4-(1)}{7-1}$$ Let $x_1=1, y_1=1, x_2=7$ and $y_2=4$

$$=\frac{3}{6}$$

$$=\frac{1}{2}$$

Next choose one point $(1,1)$ and $m=\frac{1}{2}$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$1=\frac{1}{2}(1)+b$ Replace m with $\frac{1}{2}$, x by 1 and y with 1

$\frac{1}{2}=0+b$ Adding $-\frac{1}{2}$ on both sides

$b=\frac{1}{2}$

Write the slope-intercept form using $m=\frac{1}{2}$ and $b=\frac{1}{2}$

$y=mx+b$

$y=\left(\frac{1}{2}\right)x+\left(\frac{1}{2}\right)$ Replace m with $\frac{1}{2}$ and b with $\frac{1}{2}$

$y=\frac{1}{2}x+\frac{1}{2}$

Therefore the required equation is $\boxed{y=\frac{1}{2}x+\frac{1}{2}}$

Check your result by substituting the coordinates of the point not chosen, $(1,1)$ into the equation

$y=\frac{1}{2}x+\frac{1}{2}$

$1=\frac{1}{2}(1)+\frac{1}{2}$ Replace x by 1 and y by 1

$1=\frac{2}{2}$

$1=1$

Hence the required equation of the line is $\boxed{y=\frac{1}{2}x+\frac{1}{2}}$.

Answer 28PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $(5,7)$ and $(0,6)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=(5,7)$ and $(x_2,y_2)=(0,6)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1}$$ Slope-intercept form

$$=\frac{6-(7)}{0-5}$$ Let $x_1=5, y_1=7, x_2=0$ and $y_2=6$

$$=\frac{-1}{-5}$$

$$=\frac{1}{5}$$

Next choose one point $(5,7)$ and $m=\frac{1}{5}$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$7=\frac{1}{5}(5)+b$ Replace m with $\frac{1}{5}$, x by 5 and y with 7

$7=1+b$ Adding -1 on both sides

$b=6$

Write the slope-intercept form using $m=\frac{1}{5}$ and $b=6$

$y=mx+b$

$y=\left(\frac{1}{5}\right)x+(6)$ Replace m with $\frac{1}{6}$ and b with 6

$y=\frac{1}{5}x+6$

Therefore the required equation is $\boxed{y=\frac{1}{5}x+6}$

Check your result by substituting the coordinates of the point not chosen, $(5,7)$ into the equation

$7=\frac{1}{5}x+6$

$7=\frac{1}{5}(5)+6$ Replace x by 5 and y by 7

$1=1+6$

$7=7$

Hence the required equation of the line is $\boxed{y=\frac{1}{5}x+6}$.

Answer 29PA.

Need to write an equation of the line that passes through each pair of points

Consider the equation $\left(-\frac{5}{4},1\right)$ and $\left(-\frac{1}{4},\frac{3}{4}\right)$

Need to write an equation of the line that passes through each pair of points

Let $(x_1,y_1)=\left(-\frac{5}{4},1\right)$ and $(x_2,y_2)=\left(-\frac{1}{4},\frac{3}{4}\right)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$m=\frac{y_2-y_1}{x_2-x_1}$ Slope-intercept form

$=\frac{\frac{3}{4}-(1)}{-\frac{1}{4}-\left(-\frac{5}{4}\right)}$ Let $x_1=-\frac{5}{4}, y_1=1, x_2=-\frac{1}{4}$ and $y_2=\frac{3}{4}$

$=\frac{-\frac{1}{4}}{\frac{4}{4}}$

$=-\frac{1}{4}$

Next choose one point $\left(-\frac{5}{4},1\right)$ and $m=-\frac{1}{4}$ find the y-intercept form of the line

$y=mx+b$ Slope-intercept form

$1=-\frac{1}{4}\left(-\frac{5}{4}\right)+b$ Replace m with $-\frac{1}{4}$, x by $-\frac{5}{4}$ and y with 1

$1=\frac{5}{16}+b$ Simplify

$b=\frac{11}{16}$ Adding $-\frac{5}{16}$ on both sides

Write the slope-intercept form using $m=-\frac{1}{4}$ and $b=\frac{11}{16}$

$y=mx+b$

$y=\left(-\frac{1}{4}\right)x+\left(\frac{11}{16}\right)$ Replace m with $-\frac{1}{4}$ and b with $\frac{11}{16}$

$y=-\frac{1}{4}x+\frac{11}{16}$

Therefore the required equation is $\boxed{y=-\frac{1}{4}x+\frac{11}{16}}$

Check your result by substituting the coordinates of the point not chosen, $\left(-\frac{5}{4},1\right)$ into the equation

$1=-\frac{1}{4}\left(-\frac{5}{4}\right)+\frac{11}{16}$ Replace x with $-\frac{5}{4}$ and y with 1

$1=\frac{5}{16}+\frac{11}{16}$ Multiply

$1=\frac{16}{16}$ Simplify

$1=1$

Hence the required equation of the line is $\boxed{y=-\frac{1}{4}x+\frac{11}{16}}$.

Answer 30PA.

Need to write an equation of the line that has each pair of intercepts

Consider the x-intercept is -3 and y-intercept is 5

For x-intercept we took the point as $(-3,0)$ and for y-intercept we took the point as $(0,5)$

Let us take $(x_1,y_1)=(-3,0)$ and $(x_2,y_2)=(0,5)$

Slope of the line passing through (x_1,y_1) and (x_2,y_2) is given by $m=\frac{y_2-y_1}{x_2-x_1}$

Substituting the values

$m=\frac{y_2-y_1}{x_2-x_1}$

$=\frac{5-0}{0-(-3)}$ Replace $x_1=-3, y_1=0, x_2=0$ and $y_2=5$

$=\frac{5}{0+3}$ Simplify

$=\frac{5}{3}$

Choose $(-3,0)$ and find the y-intercept of the line

$y = mx + b$

$0 = \frac{5}{3}(-3) + b$ Replace x by -3 and y by 0

$0 = -5 + b$ Simplify

$b = 5$ Adding 5 on both sides

Write the slope-intercept form using $m = \frac{5}{3}$ and $b = 5$

$y = mx + b$

$y = \left(\frac{5}{3}\right)x + 5$ Replace m by $\frac{5}{3}$ and b by 5

Therefore the required equation of the line that has each pair of point is $\boxed{y = \frac{5}{3}x + 5}$.

Answer 31PA.

Need to write an equation of the line that has each pair of intercepts

Consider the x-intercept is 3 and y-intercept is 4

For x-intercept we took the point as $(3,0)$ and for y-intercept we took the point as $(0,4)$

Let us take $(x_1, y_1) = (3,0)$ and $(x_2, y_2) = (0,4)$

Slope of the line passing through (x_1, y_1) and (x_2, y_2) is given by $m = \frac{y_2 - y_1}{x_2 - x_1}$

Substituting the values

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{4-0}{0-(3)}$ Replace $x_1 = 3, y_1 = 0, x_2 = 0$ and $y_2 = 4$

$= \frac{4}{-3}$ Simplify

$= -\frac{4}{3}$

Choose $(3,0)$ and find the y-intercept of the line

$y = mx + b$

$0 = -\frac{4}{3}(3) + b$ Replace x by 3 and y by 0

$0 = -4 + b$ Simplify

$b = 4$ Adding 4 on both sides

Write the slope-intercept form using $m=-\frac{4}{3}$ and $b=4$

$y=mx+b$

$y=\left(-\frac{4}{3}\right)x+4$ Replace m by $-\frac{4}{3}$ and b by 4

Therefore the required equation of the line that has each pair of point is $\boxed{y=-\frac{4}{3}x+4}$.

Answer 32PA.

Need to write an equation of the line that has each pair of intercepts

Consider the x-intercept is 6 and y-intercept is 3

For x-intercept we took the point as $(6,0)$ and for y-intercept we took the point as $(0,3)$

Let us take $(x_1,y_1)=(6,0)$ and $(x_2,y_2)=(0,3)$

Slope of the line passing through (x_1,y_1) and (x_2,y_2) is given by $m=\frac{y_2-y_1}{x_2-x_1}$

Substituting the values

$m=\frac{y_2-y_1}{x_2-x_1}$

$=\frac{3-0}{0-(6)}$ Replace $x_1=6, y_1=0, x_2=0$ and $y_2=3$

$=\frac{3}{-6}$ Simplify

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

Choose $(6,0)$ and find the y-intercept of the line

$y=mx+b$

$0=-\frac{1}{2}(6)+b$ Replace x by 6 and y by 0

$0=-3+b$ Simplify

$b=3$ Adding 3 on both sides

Write the slope-intercept form using $m=-\frac{1}{2}$ and $b=3$

$y=mx+b$

$y=\left(-\frac{1}{2}\right)x+3$ Replace m by $-\frac{1}{2}$ and b by 3

Therefore the required equation of the line that has each pair of point is $\boxed{y=-\frac{1}{2}x+3}$.

Answer 33PA.

Need to write an equation of the line that has each pair of intercepts

Consider the x-intercept is 2 and y-intercept is -2

For x-intercept we took the point as $(2,0)$ and for y-intercept we took the point as $(0,-2)$

Let us take $(x_1,y_1)=(2,0)$ and $(x_2,y_2)=(0,-2)$

Slope of the line passing through (x_1,y_1) and (x_2,y_2) is given by $m=\dfrac{y_2-y_1}{x_2-x_1}$

Substituting the values

$$\begin{aligned} m&=\frac{y_2-y_1}{x_2-x_1}\\ &=\frac{-2-0}{0-(2)} && \text{Replace } x_1=2, y_1=0, x_2=0 \text{ and } y_2=-2\\ &=\frac{-2}{-2} && \text{Simplify}\\ &=1 \end{aligned}$$

Choose $(2,0)$ and find the y-intercept of the line

$$\begin{aligned} y&=mx+b\\ 0&=1(2)+b && \text{Replace } x \text{ by } 2 \text{ and } y \text{ by } 0\\ 0&=2+b && \text{Simplify}\\ b&=-2 && \text{Adding } -2 \text{ on both sides} \end{aligned}$$

Write the slope-intercept form using $m=1$ and $b=-2$

$$\begin{aligned} y&=mx+b\\ y&=(1)x-2 && \text{Replace } m \text{ by } 1 \text{ and } b \text{ by } -2 \end{aligned}$$

Therefore the required equation of the line that has each pair of point is $\boxed{y=x-2}$.

Answer 34PA.

Consider the median age of men and women who tied the knot for time in 1970 was 23.2 and 20.8 and in 1998 it was 26.7 and 25

Need to write a linear equation to predict the median age that men marry M for any year t

Let us take $(x_1,y_1)=(1970,23.2)$ and $(x_2,y_2)=(1998,26.7)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) is given by

$$\begin{aligned} m&=\frac{y_2-y_1}{x_2-x_1} && \text{Slope-formulae}\\ &=\frac{26.7-23.2}{1998-1970} && \text{Replacing the values}\\ &=\frac{3.5}{28}\\ &=0.125 \end{aligned}$$

Choose $(1970, 23.2)$ and find the y-intercept of the line

$M = mt + b$ Slope-intercept form

$23.2 = 0.125(1970) + b$ Replacing the values

$23.2 = 246.25 + b$ Multiply

$b = -223.05$ Adding -246.25 on both sides

Write the slope-intercept form using $m = 0.125$ and $b = -223.05$

$M = mt + b$ Slope-intercept form

$M = (0.125)t + (-223.05)$ Replacing the values

$M = 0.125t - 223.05$

Thus the required linear equation to predict the median age that men marry M for ant year t is $\boxed{M = 0.125t - 223.05}$.

Answer 35PA.

Consider the median age of men and women who tied the knot for time in 1970 was 23.2 and 20.8 and in 1998 it was 26.7 and 25

Need to predict the median age of men who marry for the first time in 2005 by using the equation

Let us take $(x_1, y_1) = (1970, 23.2)$ and $(x_2, y_2) = (1998, 26.7)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) is given by

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ Slope-formulae

$= \dfrac{26.7 - 23.2}{1998 - 1970}$ Replacing the values

$= \dfrac{3.5}{28}$

$= 0.125$

Choose $(1970, 23.2)$ and find the y-intercept of the line

$M = mt + b$ Slope-intercept form

$23.2 = 0.125(1970) + b$ Replacing the values

$23.2 = 246.25 + b$ Multiply

$b = -223.05$ Adding -246.25 on both sides

Write the slope-intercept form using $m = 0.125$ and $b = -223.05$

$M = mt + b$ Slope-intercept form

$M = (0.125)t + (-223.05)$ Replacing the values

$M = 0.125t - 223.05$

Thus the required linear equation to predict the median age that men marry M for ant year t is $\boxed{M = 0.125t - 223.05}$.

So substituting $t = 2005$ in $M = 0.125t - 223.05$

$$\begin{aligned} M &= 0.125t - 223.05 && \text{Linear equation} \\ M &= 0.125(2005) - 223.05 && \text{Replace } t \text{ by } 2005 \\ M &= 250.625 - 223.05 && \text{Multiply} \\ M &= 27.6 \end{aligned}$$

Thus the median age of men who marry for the first time in 2005 was about $\boxed{27.6 \text{ years}}$.

Answer 36PA.

Consider the median age of men and women who tied the knot for time in 1970 was 23.2 and 20.8 and in 1998 it was 26.7 and 25

Need to write a linear equation to predict the median age of men who marry for the first time in 2005

Let us take $(x_1, y_1) = (1970, 20.8)$ and $(x_2, y_2) = (1998, 25)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) is given by

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope-formulae} \\ &= \frac{25 - 20.8}{1998 - 1970} && \text{Replacing the values} \\ &= \frac{4.2}{28} \\ &= 0.15 \end{aligned}$$

Choose $(1970, 20.2)$ and find the y-intercept of the line

$$\begin{aligned} W &= mt + b && \text{Slope-intercept form} \\ 20.8 &= 0.15(1970) + b && \text{Replacing the values} \\ 20.8 &= 295.5 + b && \text{Multiply} \\ b &= -274.7 && \text{Adding } -295.5 \text{ on both sides} \end{aligned}$$

Write the slope-intercept form using $m = 0.15$ and $b = -274.7$

$$\begin{aligned} W &= mt + b && \text{Slope-intercept form} \\ W &= (0.15)t + (-274.7) && \text{Replacing the values} \\ W &= 0.15t - 274.7 \end{aligned}$$

Thus the required linear equation to predict the median age that women marry M for ant year t is $\boxed{W = 0.15t - 274.7}$.

Answer 37PA.

Consider the median age of men and women who tied the knot for time in 1970 was 23.2 and 20.8 and in 1998 it was 26.7 and 25

Need to predict the median age of men who women for the first time in 2005 by using the equation

Let us take $(x_1, y_1) = (1970, 20.8)$ and $(x_2, y_2) = (1998, 25)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) is given by

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope-formulae} \\ &= \frac{25 - 20.8}{1998 - 1970} && \text{Replacing the values} \\ &= \frac{4.2}{28} \\ &= 0.15 \end{aligned}$$

Choose $(1970, 20.2)$ and find the y-intercept of the line

$$\begin{aligned} W &= mt + b && \text{Slope-intercept form} \\ 20.8 &= 0.15(1970) + b && \text{Replacing the values} \\ 20.8 &= 295.5 + b && \text{Multiply} \\ b &= -274.7 && \text{Adding } -295.5 \text{ on both sides} \end{aligned}$$

Write the slope-intercept form using $m = 0.15$ and $b = -274.7$

$$\begin{aligned} W &= mt + b && \text{Slope-intercept form} \\ W &= (0.15)t + (-274.7) && \text{Replacing the values} \\ W &= 0.15t - 274.7 \end{aligned}$$

Thus the required linear equation to predict the median age that women marry M for ant year t is $\boxed{W = 0.15t - 274.7}$.

So substituting $t = 2005$ in $W = 0.15t - 274.7$

$$\begin{aligned} W &= 0.15t - 274.7 && \text{Linear equation} \\ W &= 0.15(2005) - 274.7 && \text{Replace } t \text{ by } 2005 \\ W &= 300.75 - 274.7 && \text{Multiply} \\ W &= 26.05 \end{aligned}$$

Thus the median age of women who marry for the first time in 2005 was about $\boxed{26.05 \text{ years}}$.

Answer 38PA.

Need to write a linear equation to find Orlando's population for any year

In 1994 the population of Orlando was $173,000$ and in 1995 the population of Orlando was about $175,000$

Let us take $(x_1, y_1) = (1994, 173,000)$ and $(x_2, y_2) = (1995, 175,000)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) is given by

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope-formulae} \\ &= \frac{175000 - 173000}{1995 - 1994} && \text{Replacing the values} \\ &= \frac{2000}{1} \\ &= 2000 \end{aligned}$$

Choose $(1994, 173,000)$ and find the y-intercept of the line

$$\begin{aligned} y &= mx + b && \text{Slope-intercept form} \\ 173,000 &= 2000(1994) + b && \text{Replacing the values} \\ 173,000 &= 3,988,000 + b && \text{Multiply} \\ b &= -3,815,000 && \text{Adding } -3,988,000 \text{ on both sides} \end{aligned}$$

Write the slope-intercept form using $m = 2000$ and $b = -3,815,000$

$$\begin{aligned} y &= mx + b && \text{Slope-intercept form} \\ y &= (2000)x + (-3,815,000) && \text{Replacing the values} \\ y &= 2000x - 3,815,000 \end{aligned}$$

Thus the required linear equation for Orlando's population is $\boxed{y = 2000x - 3,815,000}$.

Answer 39PA.

Need to predict the Orlando's population will be in 2010

In 1994 the population of Orlando was $173,000$ and in 1995 the population of Orlando was about $175,000$

Let us take $(x_1, y_1) = (1994, 173,000)$ and $(x_2, y_2) = (1995, 175,000)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) is given by

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope-formulae} \\ &= \frac{175000 - 173000}{1995 - 1994} && \text{Replacing the values} \\ &= \frac{2000}{1} \\ &= 2000 \end{aligned}$$

Choose $(1994,173,000)$ and find the y-intercept of the line

$$\begin{aligned} y &= mx+b && \text{Slope-intercept form} \\ 173,000 &= 2000(1994)+b && \text{Replacing the values} \\ 173,000 &= 3,988,000+b && \text{Multiply} \\ b &= -3,815,000 && \text{Adding } -3,988,000 \text{ on both sides} \end{aligned}$$

Write the slope-intercept form using $m=2000$ and $b=-3,815,000$

$$\begin{aligned} y &= mx+b && \text{Slope-intercept form} \\ y &= (2000)x+(-3,815,000) && \text{Replacing the values} \\ y &= 2000x-3,815,000 \end{aligned}$$

Thus the required linear equation for Orlando's population is $\boxed{y=2000x-3,815,000}$.

Now substituting $x=2010$ in $y=2000x-3,815,000$

$$\begin{aligned} y &= 2000x-3,815,000 && \text{Equation} \\ y &= 2000(2010)-3,815,000 && \text{Replace } x \text{ by } 2010 \\ y &= 4,020,000-3,815,000 && \text{Multiply} \\ y &= 205,000 && \text{Simplify} \end{aligned}$$

Thus the required Orlando's population in 2010 it will be $\boxed{205,000}$.

Answer 40PA.

Need to write a linear equation to find the total cost C of renting the canoe for h hours

Consider if you rent a canoe for 3 hours, you will pay $\$45$

Rent of canoe for three hours is $\$45$

Therefore the rent of canoe for one hour is

$$\frac{\$45}{3}=\$15$$

Thus the rent of canoe for h hours is

$$\frac{\$45}{3}h=\$15h$$

Therefore the total cost of renting the canoe for h hours is $\boxed{\$15h}$.

Answer 41PA.

Consider the line passes through $(14,2)$ and $(18,6)$

Need to find the equation of the line

Let us take $(x_1,y_1)=(14,2)$ and $(x_2,y_2)=(18,6)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) points is given by

$m=\frac{y_2-y_1}{x_2-x_1}$ Slope formulae

$m=\frac{6-2}{28-14}$ Replacing $x_1=14, y_1=2, x_2=28, y_2=6$

$m=\frac{4}{14}$

$m=\frac{2}{7}$ Simplify

Choose $(14,2)$ and find the y-intercept of the line

$y=mx+b$

$2=\frac{2}{7}(14)+b$ Replace $x=14, y=2$ and $m=\frac{2}{7}$

$2=4+b$ Simplify

$b=-2$ Adding -2 on both sides

Now write the slope-intercept form using $m=\frac{2}{7}$ and $b=-2$

$y=mx+b$ Slope-intercept form

$y=\left(\frac{2}{7}\right)x+(-2)$ Replace m with $\frac{2}{7}$ and b with -2

$y=\frac{2}{7}x-2$

Thus the required equation of the line passing through the points is $\boxed{y=\frac{2}{7}x-2}$.

Answer 42PA.

Consider the line passes through $(14,2)$ and $(18,6)$

Need to find the slope of the line

Let us take $(x_1,y_1)=(14,2)$ and $(x_2,y_2)=(18,6)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) points is given by

$m=\frac{y_2-y_1}{x_2-x_1}$ Slope formulae

$m=\frac{6-2}{28-14}$ Replacing $x_1=14, y_1=2, x_2=28, y_2=6$

$m=\frac{4}{14}$

$m=\frac{2}{7}$ Simplify

Thus the slope of the line passing through the given points is $\boxed{m=\frac{2}{7}}$.

Answer 43PA.

Consider the line passes through $(14,2)$ and $(18,6)$

Need to find where the line intersects the x-axis and the y-axis

Let us take $(x_1,y_1)=(14,2)$ and $(x_2,y_2)=(18,6)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2) points is given by

$m=\frac{y_2-y_1}{x_2-x_1}$ Slope formulae

$m=\frac{6-2}{28-14}$ Replacing $x_1=14, y_1=2, x_2=28, y_2=6$

$m=\frac{4}{14}$

$m=\frac{2}{7}$ Simplify

Choose $(14,2)$ and find the y-intercept of the line

$y=mx+b$

$2=\frac{2}{7}(14)+b$ Replace $x=14, y=2$ and $m=\frac{2}{7}$

$2=4+b$ Simplify

$b=-2$ Adding -2 on both sides

Now write the slope-intercept form using $m=\frac{2}{7}$ and $b=-2$

$y=mx+b$ Slope-intercept form

$y=\left(\frac{2}{7}\right)x+(-2)$ Replace m with $\frac{2}{7}$ and b with -2

$y=\frac{2}{7}x-2$

Thus the required equation of the line passing through the points is $y=\frac{2}{7}x-2$.

For find the y-axis

Replace x with zero

$y=\frac{2}{7}x-2$

$y=\frac{2}{7}(0)-2$ Replace x with 0

$y=0-2$

$y=-2$

For finding the x-axis

Replace y with zero

$$0=\frac{2}{7}x-2 \qquad \text{Replacing } y \text{ with } 0$$

$$2x-14=0 \qquad \text{Multiplying both sides by } 7$$

$$2x=14 \qquad \text{Adding } 4 \text{ on both sides}$$

$$x=7 \qquad \text{Dividing both sides by } 2$$

Therefore the line intersects x-axis at $\boxed{(7,0)}$ and the y-axis intersects at $\boxed{(0,-2)}$.

Answer 44PA.

Need to write an equation of the line

The x-intercept of a line is p

And the y-intercept of a line is q

Thus the two points are $(p,0)$ and $(0,q)$

Let us take $(x_1,y_1)=(p,0)$ and $(x_2,y_2)=(0,q)$

Equation of the line passing through points (x_1,y_1) and (x_2,y_2) is given by

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \text{Slope formuale}$$

$$m=\frac{q-0}{0-p} \qquad \text{Replacing the values}$$

$$m=\frac{q}{-p} \qquad \text{Simplify}$$

$$m=-\frac{q}{p}$$

Choose $(p,0)$ and find the y-intercept of the line

$$y=mx+b \qquad \text{Slope-intercept form}$$

$$0=-\frac{q}{p}(p)+b \qquad \text{Replacing the values}$$

$$0=-q+b \qquad \text{Simplify}$$

$$b=q \qquad \text{Adding } q \text{ on both sides}$$

Write the slope-intercept form using $m=-\frac{q}{p}$ and $b=q$

$$y=mx+b \qquad \text{Slope-intercept}$$

$$y=\left(-\frac{q}{p}\right)x+(q) \qquad \text{Replace } m \text{ with } -\frac{p}{q} \text{ and } b \text{ with } q$$

$$y=-\frac{p}{q}x+p$$

Thus the required equation of a line is $\boxed{y=-\frac{p}{q}x+p}$.

Answer 45PA.

Need to find how can slope-intercept form be used to make the predictions?

Definition of linear extrapolation and an explanation of how slope-intercept form is used in linear extrapolation

Linear extrapolation is when you use a linear equation to predict the values that are outside of the given points on the graph

Now the explanation of how slope-intercept form is used in linear extrapolation is

You can use the slope-intercept form of the equation to find the y-value for any requested x value.

Answer 46PA.

Consider the line has the slope $\frac{1}{3}$ through $(-2,1)$

$a) y=\frac{1}{3}x+1$ $b) y=\frac{1}{3}x+\frac{5}{3}$ $c) y=\frac{1}{3}x-\frac{5}{3}$ $d) y=\frac{1}{3}x+\frac{1}{3}$

Need to choose the correct option

For finding the y-intercept of the line choose $(-2,1)$

$y=mx+b$	Slope-intercept form
$1=\frac{1}{3}(-2)+b$	Choose $m=\frac{1}{3}, x=-2$ and $y=1$
$1=-\frac{2}{3}+b$	Multiply
$b=\frac{5}{3}$	Adding $\frac{2}{3}$ on both sides

Now write the slope intercept form using $m=\frac{1}{3}$ and $b=\frac{5}{3}$

$y=mx+b$	Slope-intercept form
$y=\left(\frac{1}{3}\right)x+\left(\frac{5}{3}\right)$	Replace m with $\frac{1}{3}$ and b with $\frac{5}{3}$
$y=\frac{1}{3}x+\frac{5}{3}$	

Thus the required equation of the line passing through the given slope $\frac{1}{3}$ and the point through $(-2,1)$ is $\boxed{y=\frac{1}{3}x+\frac{5}{3}}$.

Thus the correct option is $\boxed{\text{B}}$.

Answer 48MYS.

Consider the equation $y = 3x - 2$

Need to graph the equation

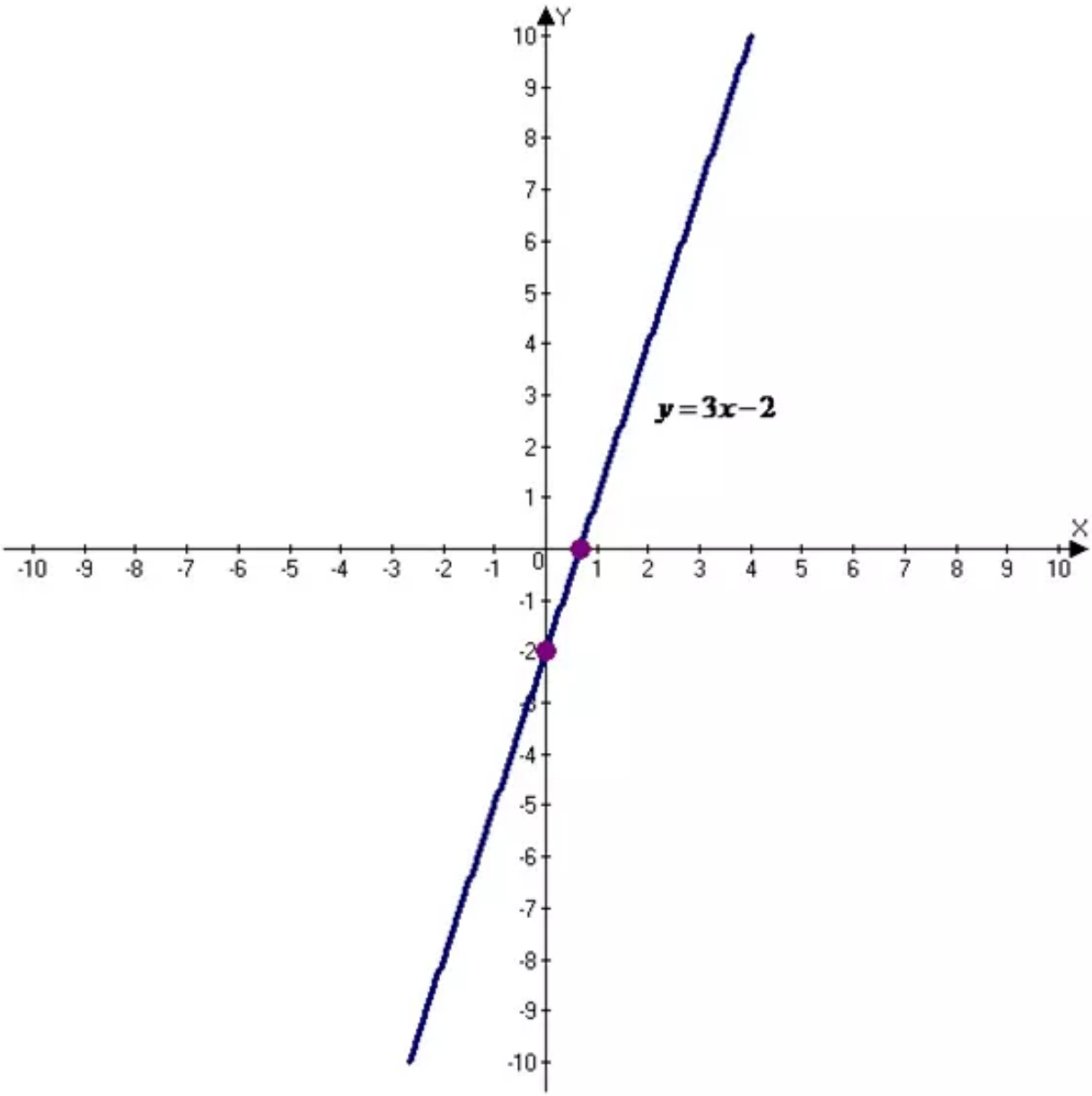
Here the y-intercept is -2. So, the graph $(0, -2)$

The slope is $\frac{3}{1}$ $\qquad\qquad$ $\frac{\text{Rise}}{\text{Run}}$

From $(0, -2)$, move up 3 units and right one unit. Draw a dot

Draw a line connecting the points

The graph is shown below



Thus the required graph is drawn.

Answer 49MYS.

Consider the equation $x+y=6$

Need to graph the equation

Adding $-x$ on both sides

$$x+y=6$$
$$-x+x+y=6-x \qquad \text{Adding } -x \text{ on both sides}$$
$$y=-x+6$$

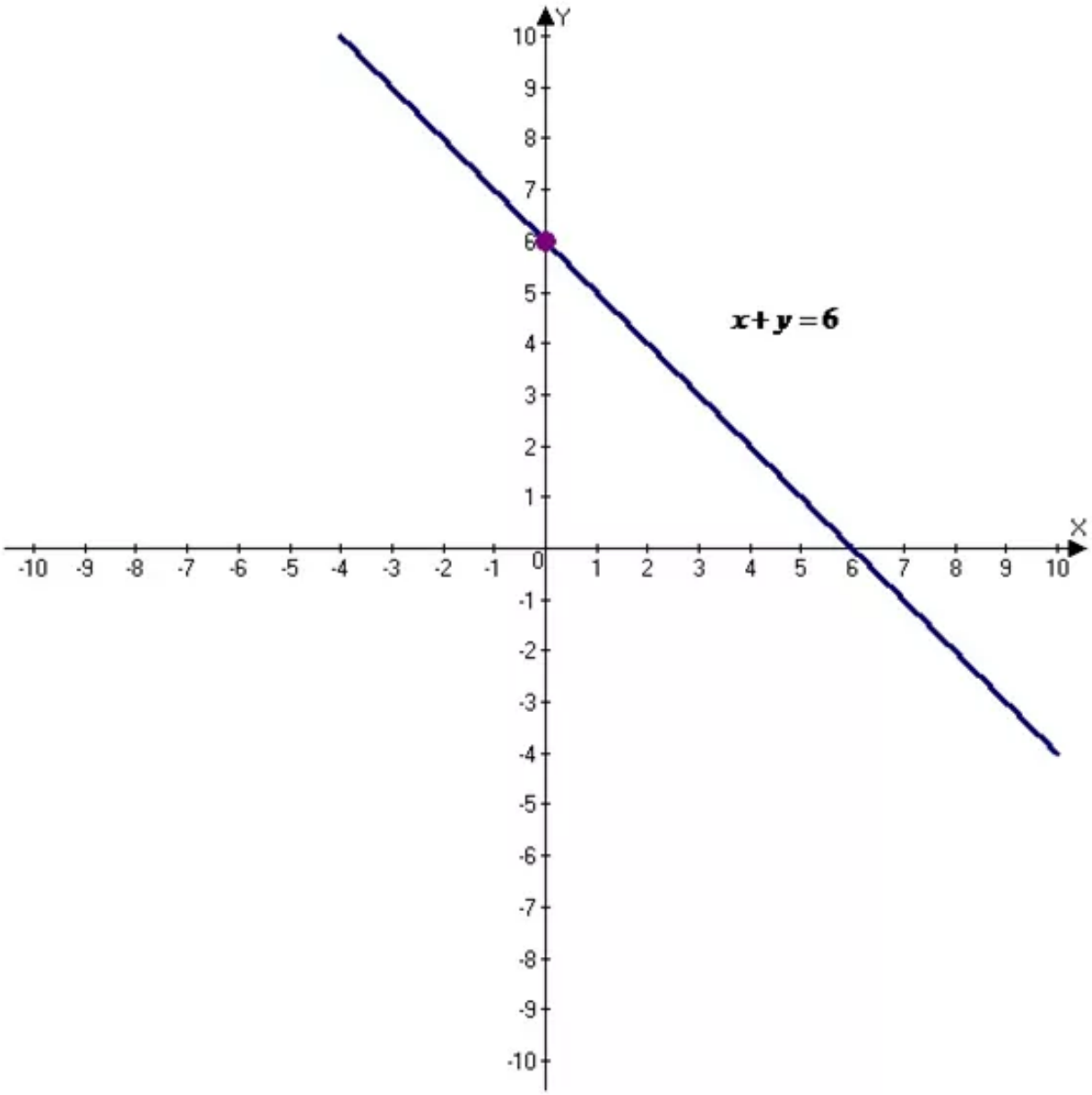
Here the y-intercept is 6. So, the graph $(0,6)$

The slope is $\frac{-1}{1}$ $\qquad \frac{\text{Rise}}{\text{Run}}$

From $(0,6)$, move down 1 unit and right one unit. Draw a dot

Draw a line connecting the points

The graph is shown below



Thus the required graph is drawn.

Answer 50MYS.

Consider the equation $x+2y=8$

Need to graph the equation

Adding $-x$ on both sides

$$x+2y=8$$

$$-x+x+2y=8-x \qquad \text{Adding } -x \text{ on both sides}$$

$$2y=-x+8$$

$$y=-\frac{1}{2}x+4 \qquad \text{Dividing both sides by 2}$$

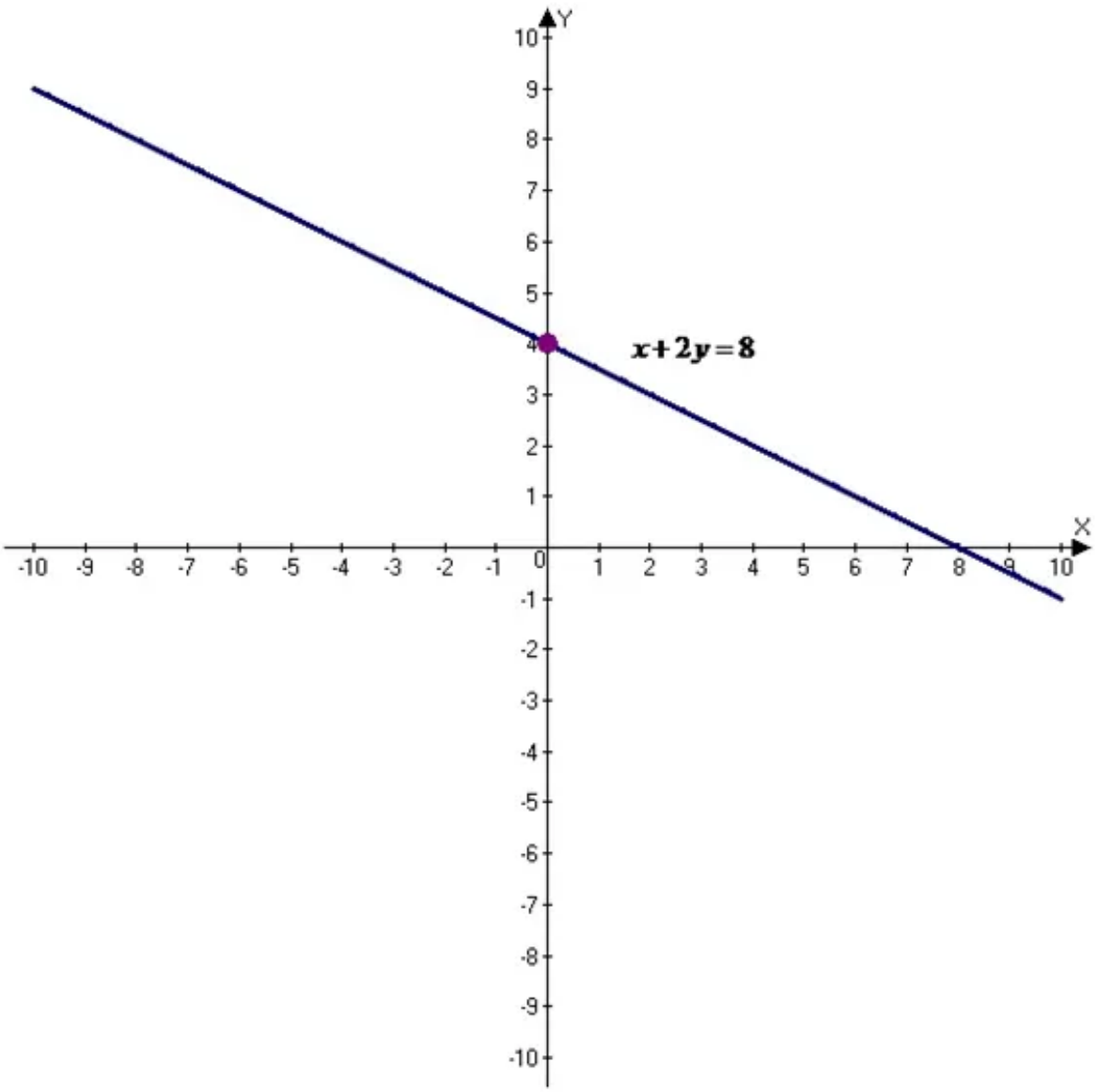
Here the y-intercept is 4. So, the graph $(0,4)$

The slope is $\frac{-1}{2}$ $\qquad \frac{\text{Rise}}{\text{Run}}$

From $(0,6)$, move down 1 unit and right two units. Draw a dot

Draw a line connecting the points

The graph is shown below



Thus the required graph is drawn.

Answer 51MYS.

Need to write a direct variation equation that relates the total volume of blood V with the number of times your heart beats b

Each time your heart beats, it pumps 2.5 ounces of blood through your heart

If you know that y varies directly as x, you can write a direct variation equation that relates the two quantities

Direct variation equation is of the $y = kx$ where $k \neq 0$

Here the total volume of blood V varies directly as the number of times your heart beats b

$V \propto b$

$V = kb$

Each time your heart beats, it pumps 2.5 ounces of blood through your heart

So substituting $k = 2.5$ in $V = kb$

$V = kb$

$V = 2.5b$

Thus the required direct variation equation that relates the total volume of blood V with the number of times your heart beats b is $\boxed{V = 2.5b}$.

Answer 52MYS.

Consider the relation $\{(0,8),(9,-2),(4,2)\}$

Need to state the domain of the relation

By basing above relation we set the tabular values as shown below

x	y
0	8
9	−2
4	2

The domain is simply the set of all x-values

So the values would be $\{0,9,4\}$

Thus the required domain for the relation is $\boxed{\{0,9,4\}}$.

Answer 53MYS.

Consider the relation $\{(-2,1),(5,1),(-2,7),(0,-3)\}$

Need to state the domain of the relation

By basing above relation we set the tabular values as shown below

x	y
−2	1
5	1
−2	7
0	−3

The domain is simply the set of all x-values

So the values would be $\{-2,0,5\}$

Thus the required domain for the relation is $\boxed{\{-2,0,5\}}$.

Answer 54MYS.

Consider the relation $-3 \square -5$

Need to make a true sentence replace $\square$ with $<, >,$ or $=$

Here -3 is greater than -5

The greater than symbol is used to express a larger value also called a "right arrow" it is also used to transfer the output of process

And when one value is bigger than other we use a greater than sign. Here -3 is greater than -5

So in the bracket we use "greater than symbol"

Thus the relation to make a true sentence is $\boxed{-3 \boxed{>} -5}$.

Answer 55MYS.

Consider the relation $4 \square \frac{16}{3}$

Need to make a true sentence replace $\square$ with $<, >,$ or $=$

Here 4 is less than $\frac{16}{3}$

And when one value is smaller than other we use a less than sign. Here 4 is less than $\frac{16}{3}$

So in the bracket we use "less than symbol"

Thus the relation to make a true sentence is $\boxed{4 \boxed{<} \frac{16}{3}}$.

Answer 56MYS.

Consider the relation $\frac{3}{4} \square \frac{2}{3}$

Need to make a true sentence replace $\square$ with $<, >,$ or $=$

Here $\frac{3}{4}$ is greater than $\frac{2}{4}$

The greater than symbol is used to express a larger value also called a "right arrow" it is also used to transfer the output of process

And when one value is bigger than other we use a greater than sign. Here $\frac{3}{4}$ is greater than $\frac{2}{4}$

So in the bracket we use "greater than symbol"

Thus the relation to make a true sentence is $\boxed{\frac{3}{4} \boxed{>} \frac{2}{3}}$.

Answer 57MYS.

Consider the expression $4-7$

Need to find the difference

Here 7 is positive

So the expression becomes

$$4-7=4-(+7)$$

Here you are subtracting a positive from a positive. So the result is less positive

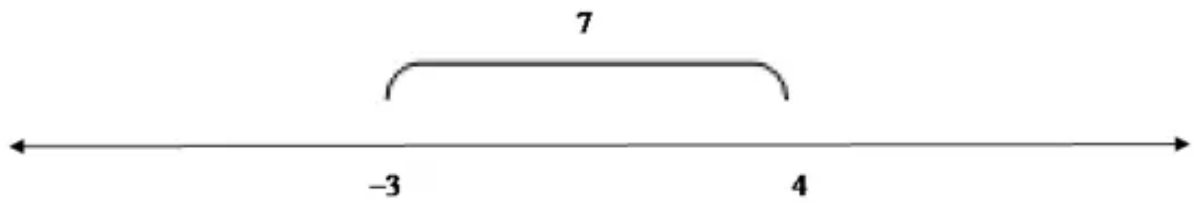
Therefore you will start at 4 and you have to move to the left

In this case, you will move 7 units to the left

You end up at -3

Thus the answer is $\boxed{-3}$

Take a look at the number line below to see how this is done



Thus the answer is $\boxed{-3}$.

Answer 58MYS.

Consider the expression $5-12$

Need to find the difference

Here 12 is positive

So the expression becomes

$$5-12=5-(+12)$$

Here you are subtracting a positive from a positive. So the result is less positive

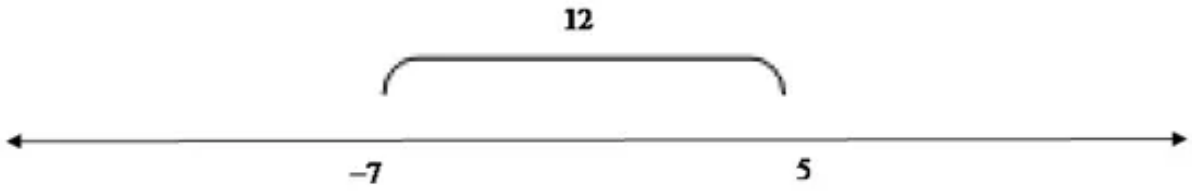
Therefore you will start at 5 and you have to move to the left

In this case, you will move 12 units to the left

You end up at -7

Thus the answer is $\boxed{-7}$

Take a look at the number line below to see how this is done



Thus the answer is $\boxed{-7}$.

Answer 59MYS.

Consider the expression $2-(-3)$

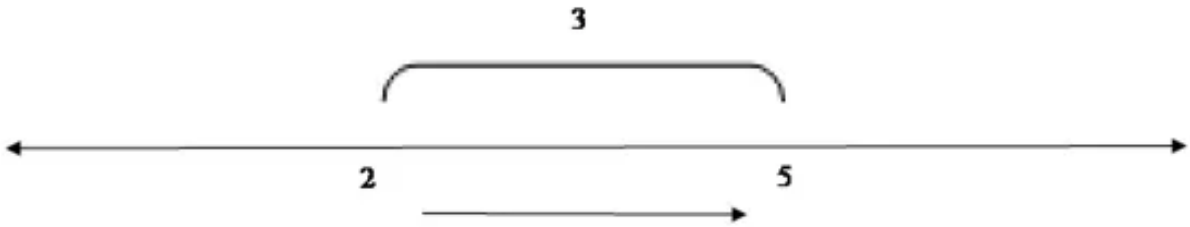
Need to find the difference

Start at 2 and move 3 units to the right and end up at 5

So the answer is 5

Finally, subtracting a positive from a negative makes the result less positive. So you will move to the left to get the answer

Took a look at the number line below to see how this is done



Thus the answer is $\boxed{5}$.

Answer 60MYS.

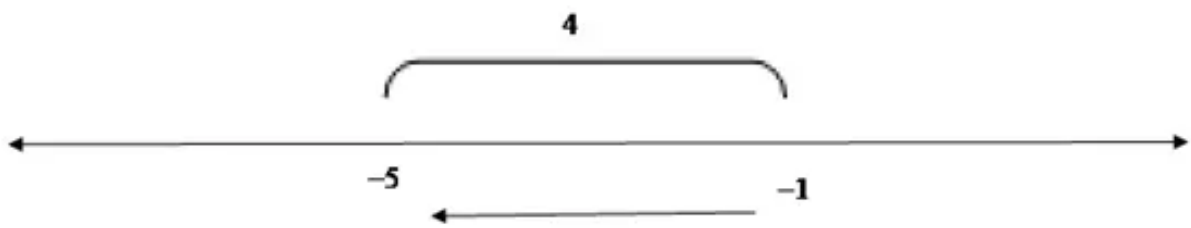
Consider the expression $-1-4$

Need to find the difference

Start at -1 and move 4 units to the left. You end up at -5

So the answer is -5

Took a look at the number line below to see how this is done



Thus the answer is $\boxed{-5}$.

Answer 61MYS.

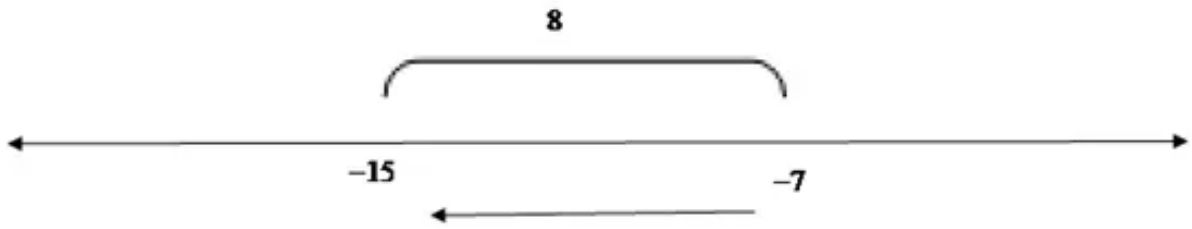
Consider the expression $-7-8$

Need to find the difference

Start at -7 and move 8 units to the left. You end up at -15

So the answer is -15

Took a look at the number line below to see how this is done



Thus the answer is $\boxed{-15}$

Answer 62MYS.

Consider the expression $-5-(-2)$

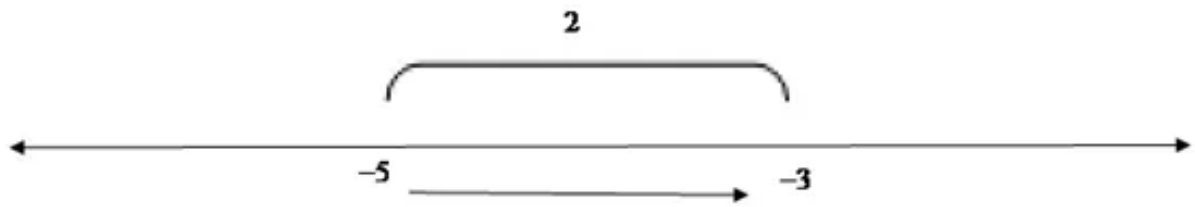
Need to find the difference

In general subtracting a negative from a negative makes the result less negative or more positive and you have to move to the right to get the answer

To find $-5-(-2)$ you have to start at -5 and move 2 units to the right

If you do that, you will end up at -3

Took a look at the number line below to see how this is done



Thus the answer is $\boxed{-3}$.