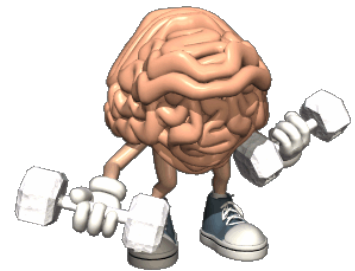
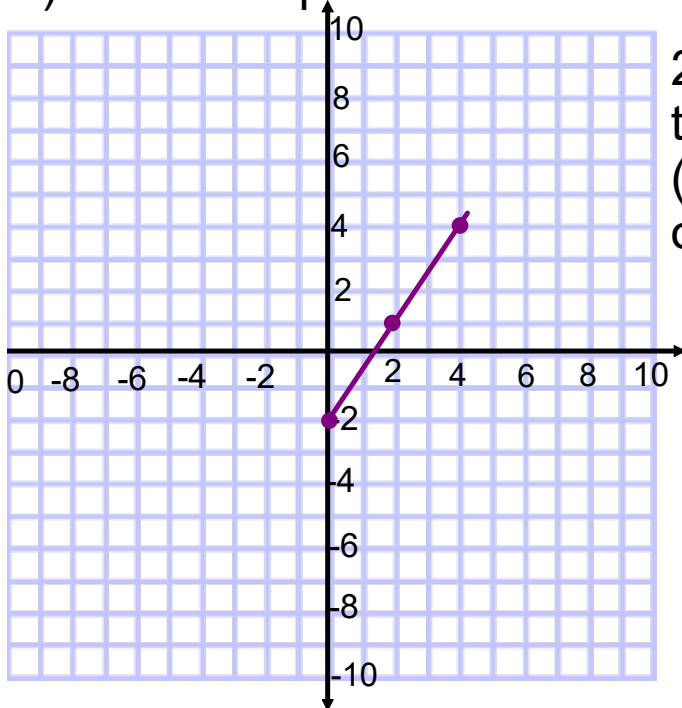


Warm Up



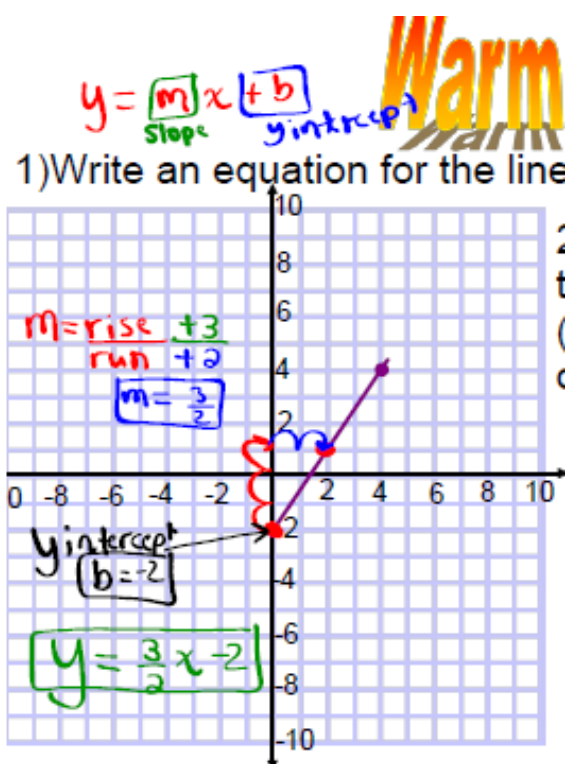
1) Write an equation for the line :



2) Write an equation of a line that passes through $(-7, 4)$ and $(-5, 10)$ and has a y intercept of -5 .

3) Given the equations $y = \frac{2}{5}x + 6$, state the

- i) Slope
- ii) y-intercept
- iii) x- intercept $(k+y=0)$



Solution to Warm Up

2) Write an equation of a line that passes through $(-7, 4)$ and $(-5, 10)$ and has a y intercept of -5 .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 4}{-5 - (-7)} = \frac{6}{-5 + 7} = \frac{6}{2} = 3$$

$b = -5$
 $m = 3$

$$y = 3x - 5$$

Solution to Warm Up

$$y = mx + b$$



3) Given the equations

$y = \frac{2}{5}x + 6$, state the

$y = mx + b$

- i) Slope $m = \frac{2}{5}$
- ii) y-intercept $b = +6$
- iii) x- intercept

Solution to Warm Up

$$y = \frac{2}{5}x + 6$$

↓
let $y = 0$
(Sub into equation)

$$0 = \frac{2}{5}x + 6$$

Solve for "x"

$$0 - 6 = \frac{2}{5}x + 6 - 6$$

$$(5) \cdot (-6) = \frac{2}{5}x \cdot (5)$$

$$-30 = \frac{2}{1}x$$

$$\boxed{-15 = x}$$

$$y = mx + b$$

You need a

Slope (m)

y-intercept (b)

Point - Slope Form

You can also find the equation of a line if you are given a point and the slope of the line. In order to do this you use the formula:

study

$$y - y_1 = m(x - x_1)$$

You need a
-Point & a Slope
(x, y) *m*

The **x and y values from the given point**

This equation can be rearranged

to $y = mx + b$

(slope intercept)

$$y - y_1 = m (x - x_1)$$

Slope point form is a rearrangement of

$$m = \frac{y - y_1}{x - x_1}$$

$$m = \frac{(y - y_1)}{(x - x_1)}$$

$$\cancel{(x - x_1)} \cdot m = \frac{(y - y_1)}{\cancel{(x - x_1)}} \cdot \cancel{(x - x_1)}$$

$$m (x - x_1) = y - y_1$$

Example 1:

Find the equation of a line that passes through $(-3, 4)$ and has the same slope as $y = 3x + 2$.

Write what you know:

$$m = 3 \quad \begin{matrix} x_1, y_1 \\ (-3, 4) \end{matrix}$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 3(x - (-3))$$

fix sign

$$y - 4 = 3(x + 3)$$

$$y - 4 = 3(x + 3)$$

$$y - 4 = 3x + 9$$

$$y - 4 = 3x + 9 + 4$$

$$y = 3x + 13$$

first get to
Point Slope Form

expand through
bracket

slope $y = mx + b$
intercept form
then continue to
rearrange to get to

Slope Intercept Form

Find the equation of the line if it has a slope of -3 and it goes through the point $(1,7)$

$$y - y_1 = m(x - x_1)$$

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

$$y - 7 = -3x + 3$$

$$y - 7 + 7 = -3x + 3 + 7$$

$$y = -3x + 10$$

point - slope

↓ slope
intercept
rearrange

$$y = mx + b$$

Leave in point slope form

Given $y - 3 = \frac{-2}{5}(x+4)$ determine the slope and a point on the line

$$y - y_1 = m(x - x_1)$$

$$y - 3 = \frac{2}{5}(x - -4)$$

y_1 m x_1

$$(x_1, y_1)$$

$$(-4, 3) \quad m = \frac{2}{5}$$

$$y - y_1 = m(x - x_1)$$

Homework

page 372-375

4(a,d), 5(a,c), 9(a)(ii), 11(a), 14a, 20(a)

4. For each equation, identify the slope of the line it represents and the coordinates of a point on the line.

✕ a) $y - 5 = -4(x - 1)$

b) $y + 7 = 3(x - 8)$

c) $y + 11 = (x + 15)$

✕ d) $y = 5(x - 2)$

e) $y + 6 = \frac{4}{7}(x + 3)$

f) $y - 21 = -\frac{8}{5}(x + 16)$

5. Write an equation for the graph of a linear function that:

✕ a) has slope -5 and passes through $P(-4, 2)$

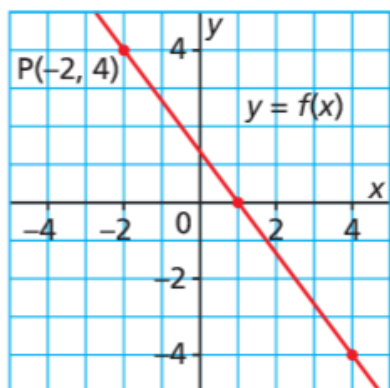
b) has slope 7 and passes through $Q(6, -8)$

*c) has slope $-\frac{3}{4}$ and passes through $R(7, -5)$

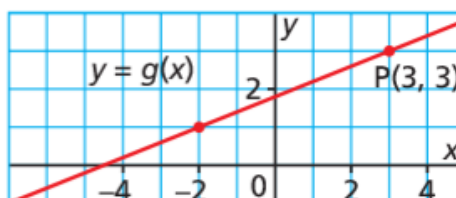
d) has slope 0 and passes through $S(3, -8)$

9* a) For each line, write an equation in slope-point form.

i)



ii)

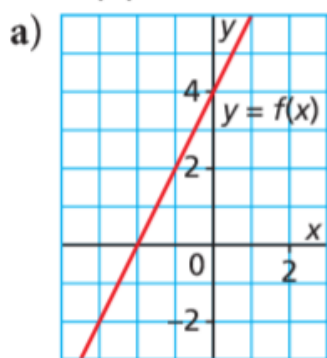


- 11.** Write an equation for the line that passes through each pair of points. Write each equation in slope-point form and in slope-intercept form.

a) $B(-2, -5)$ and $C(1, 1)$

- 14.** Match each graph with its equation.

Justify your choice.



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

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

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

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

20. a) Write an equation for the line that passes through $D(-5, -3)$ and is:

i) parallel to the line $y = -\frac{4}{3}x + 1$

ii) perpendicular to the line $y = -\frac{4}{3}x + 1$

$m =$

$m_{\perp} =$

NRF 10 Ch 6 Lesson 4 of e learning point slope form SMART lesson.notebook

$$y - y_1 = m(x - x_1)$$

SOLUTIONS

page 372 4(a,d), 5(a,c), 9(a)(ii), 11(a), 14, 20(a)

4) $y - 5 = -4(x - 1)$ $m = -4$ $P(1, 5)$ $y - 5 = -4(x - 1)$
 $y - 5 = -4x + 4$ $y + 4 = -4x + 9$ $y = -4x + 9$

d) $y = 5(x - 2)$ $y - 2 = 5(x - 4)$ $y - 2 = 5x - 20$ $y = 5x - 18$

9) a) $P(-2, 4)$
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8 - 4}{6 - -2} = \frac{-12}{8} = -\frac{3}{2}$

$y - y_1 = m(x - x_1)$
 a) $y - 4 = -\frac{3}{2}(x - (-2))$
 $y - 4 = -\frac{3}{2}x - 3$
 $y = -\frac{3}{2}x - 3 + 4$
 $y = -\frac{3}{2}x + 1$

b) $y = -\frac{3}{2}x + 1$
 x-intercept (let $y = 0$)
 $0 = -\frac{3}{2}x + 1$
 $-\frac{3}{2}x = -1$
 $x = \frac{2}{3}$
 y-intercept = 1

11) $P(3, 3)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2}{5}$

$y - y_1 = m(x - x_1)$
 a) $y - 3 = \frac{2}{5}(x - 3)$
 b) $y - 3 = \frac{2}{5}x - \frac{6}{5}$
 $y - 3 = \frac{2}{5}x - \frac{6}{5} + \frac{3}{1}$
 $y = \frac{2}{5}x - \frac{6}{5} + \frac{9}{5}$
 $y = \frac{2}{5}x + \frac{3}{5}$
 y intercept = $\frac{3}{5}$

x-intercept (let $y = 0$)
 $0 = \frac{2}{5}x + \frac{3}{5}$
 $-\frac{3}{5} = \frac{2}{5}x$
 $-9 = 2x$
 $x = -\frac{9}{2}$

ii) $P(-2, 5)$ $Q(1, 1)$ $R(5, -2)$
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 5}{1 - (-2)} = \frac{-4}{3} = -\frac{4}{3}$
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 1}{5 - 1} = \frac{-3}{4} = -\frac{3}{4}$
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 5}{5 - (-2)} = \frac{-7}{7} = -1$
 $y - y_1 = m(x - x_1)$
 $y - 1 = -1(x - 1)$
 $y - 1 = -x + 1$
 $y = -x + 2$

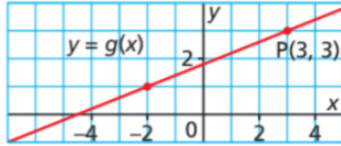
ii) a) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4}{2} = 2$
 Point $(3, -2)$ $y + 2 = 2(x + 3)$
 $y + 2 = 2x + 6$
 $y = 2x + 4$
 Point $(-1, 2)$ $y - 2 = 2(x + 1)$
 $y - 2 = 2x + 2$
 $y = 2x + 4$
 Point $(0, 4)$ $y - 4 = 2(x - 0)$
 $y - 4 = 2x$
 $y = 2x + 4$
 Point $(1, 6)$ $y - 6 = 2(x - 1)$
 $y - 6 = 2x - 2$
 $y = 2x + 4$

SOLUTIONS

page 372 4(a,d), 5(a,c), 9(a,b)(ii), 11(a), 14, 20(a)

9. a) For each line, write an equation in slope-point form.

*ii)



$$y - y_1 = m (x - x_1)$$

$$y - 3 = \frac{2}{5} (x - 3)$$

$$\begin{matrix} (-2, 1), & (3, 3) \\ \swarrow & \searrow \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

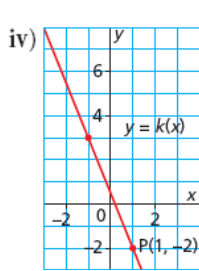
or

$$\begin{aligned} m &= \frac{\text{rise}}{\text{run}} \\ &= \frac{2}{5} \end{aligned}$$

$$y - 1 = \frac{2}{5} (x + 2)$$

$$6 = 3x$$

$$x = 2$$



$$y - y_1 = m (x - x_1)$$

$$y + 2 = -\frac{5}{2}(x - 1)$$

b) Write each equation in part a in slope-intercept form, then determine the x- and y-intercepts of each graph.

$$y + 2 = -\frac{5}{2}(x - 1)$$

$$y + 2 = -\frac{5}{2}x + \frac{5}{2}$$

$$y = -\frac{5}{2}x + \frac{5}{2} - \frac{2}{1}$$

✓ need C.O

$$y = -\frac{5}{2}x + \frac{5}{2} - \frac{4}{2}$$

$$y = -\frac{5}{2}x + \frac{1}{2}$$

x intercept

$$0 = -\frac{5}{2}x + \frac{1}{2}$$

$$-\frac{1}{2} = -\frac{5}{2}x$$

$$-2 = -10x$$

$$x = \frac{2}{10}$$

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

y intercept

$$-\frac{5}{2}$$

11. Write an equation for the line that passes through each pair of points.
Write each equation in slope-point form and in slope-intercept form.

a) B(-2, -5) and C(1, 1)

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

$$m = \frac{1 + 5}{1 + 2}$$

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

$$m = 2$$

Slope: 2 Point: (1,1)

$$y - y_1 = m(x - x_2)$$

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

Point slope form

$$y = 2x - 2 + 1$$

$$y = 2x - 1$$

Slope Intercept form

b) Q(-4, 7) and R(5, -2)

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

$$m = \frac{-2 - 7}{5 + 4}$$

$$m = \frac{-9}{9}$$

$$m = -1$$

Slope: -1 Point: (5,-2)

$$y - y_1 = m(x - x_2)$$

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

Point slope form

$$y = -1x - 2 + 5$$

$$y = -x + 3$$

Slope Intercept form

c) U(-3, -7) and V(2, 8)

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

$$m = \frac{8 - (-7)}{2 - (-3)}$$

$$m = \frac{15}{5}$$

$$m = 3$$

Slope: 3 Point: (2,8)

$$y - y_1 = m(x - x_2)$$

$$y - 8 = 3(x - 2)$$

Point slope form

$$y = 3x - 6 + 8$$

$$y = 3x + 2$$

Slope Intercept form

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

d) H(-7, -1) and J(-5, -5)

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

$$m = \frac{-5 - (-1)}{-5 - (-7)}$$

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

$$m = -2$$

Slope: -2 Point: (-5,-5)

$$y - y_1 = m(x - x_2)$$

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

Point slope form

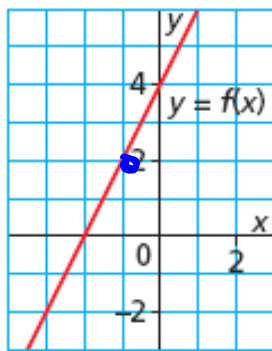
$$y = -2x - 10 - 5$$

$$y = -2x - 15$$

Slope Intercept form

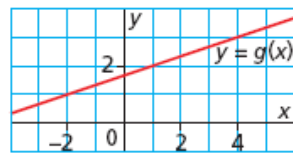
14. Match each graph with its equation. Justify your choice.

~~a)~~



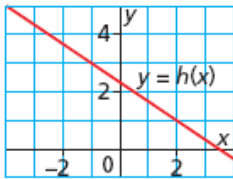
~~$y + 1 = 2(x - 2)$~~ $\rightarrow (2, -1)$
 ~~$y + 2 = 2(x - 1)$~~ $\rightarrow (1, -2)$
 $y - 2 = 2(x + 1)$ $\rightarrow (-1, 2)$
 ~~$y + 1 = -2(x - 2)$~~

b)



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

c)



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

20. a) Write an equation for the line that passes through $D(-5, -3)$ and is:

~~*~~
~~*~~

i) parallel to the line $y = -\frac{4}{3}x + 1$

Point : $(-5, -3)$ $m = -\frac{4}{3}$

$$y - y_1 = m(x - x_1)$$

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

Point slope form $y + 3 = -\frac{4}{3}(x + 5)$

~~*~~

ii) perpendicular to the line $y = -\frac{4}{3}x + 1$

Point : $(-5, -3)$ $m = \frac{3}{4}$

$$y - y_1 = m(x - x_1)$$

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

Point slope form $y + 3 = \frac{3}{4}(x + 5)$
--

b) Compare the equations in part a. How are they alike?
How are they different?

The both have the same point but opposite reciprocal slopes

$$3y + 9 = -4(x + 5)$$

$$3y = -4(x + 5) - 9$$

$$3y = -4x - 20 - 9$$

$$3y = -4x - 29$$

slope intercept form $y = -\frac{4x}{3} - \frac{29}{3}$
--

$$4y + 12 = 3(x + 5)$$

$$4y = 3(x + 5) - 12$$

$$4y = 3x + 15 - 12$$

$$4y = 3x + 3$$

slope intercept form $y = \frac{3x}{4} + \frac{3}{4}$
--

Attachments

Point slope form.docx