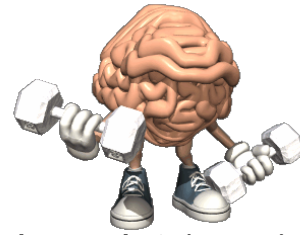


Test
NR F
Thursday
May 25

Warm Up



1) Write an equation when given $m = -5$ and a point $(-7, 5)$

Slope $m = -5$
 point $(-7, 5)$
 x_1, y_1

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

$$y - 5 = -5(x - (-7))$$

$$y - 5 = -5(x + 7)$$

$$y - 5 = -5x - 35 + 5$$

$$y = -5x - 30$$

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

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

$$= \frac{10 - 4}{-5 - (-7)}$$

$$= \frac{10 - 4}{-5 + 7} = \frac{6}{2} = 3$$

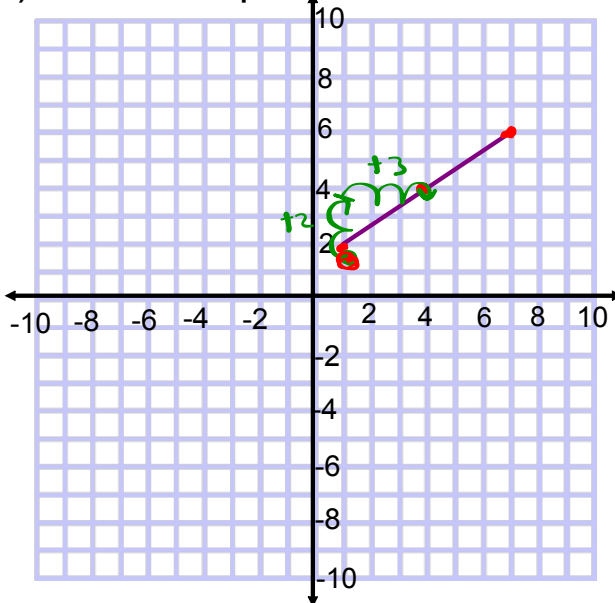
$$b = -5$$

$$m = 3$$

$$y = mx + b$$

$$y = 3x - 5$$

3) Write an equation for the line :



Pick off graph
 Point $(1, 2)$
 x_1, y_1

$$m = \frac{\text{rise}}{\text{run}}$$

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

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

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

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

$$3y - 6 = 2x - 2$$

$$3y = 2x + 4$$

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

OR

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

add fractions and C.D.

$$y = \frac{2}{3}x - \frac{2}{3} + \frac{6}{3}$$

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

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

Homework QUESTIONS from last night

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

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

5) $m = -5$ $P(-4, 2)$
 $y - 2 = -5(x + 4)$
 $y - 2 = -5x - 20$
 $y = -5x - 18$

9) $m = \frac{3}{4}$ $P(5, 2)$
 $y - 2 = \frac{3}{4}(x - 5)$
 $y - 2 = \frac{3}{4}x - \frac{15}{4}$
 $y = \frac{3}{4}x - \frac{15}{4} + 2$
 $y = \frac{3}{4}x - \frac{15}{4} + \frac{8}{4}$
 $y = \frac{3}{4}x - \frac{7}{4}$

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

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

b) $y = -\frac{4}{3}x + \frac{4}{3}$
 x-intercept (let $y = 0$)
 $0 = -\frac{4}{3}x + \frac{4}{3}$
 $-\frac{4}{3} = -\frac{4}{3}x$
 $1 = -x$
 $x = -1$

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

$y - y_1 = m(x - x_1)$
 $y - 3 = \frac{2}{5}(x - 3)$

b) $y - 3 = \frac{2}{5}x - \frac{6}{5}$
 $y - 3 = \frac{2}{5}x - \frac{6}{5} + \frac{6}{5}$
 $y = \frac{2}{5}x - \frac{6}{5} + \frac{6}{5}$
 $y = \frac{2}{5}x + \frac{9}{5}$

y intercept = $\frac{9}{5}$

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

ii) $B(-2, 5)$ $C(1, 1)$ $Q(-4, 7)$ $R(5, -2)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 5}{1 - (-2)} = \frac{-4}{3}$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 7}{5 - (-4)} = \frac{-9}{9} = -1$

$y - y_1 = m(x - x_1)$
 $y - 1 = -\frac{4}{3}(x - 1)$ ← point slope
 $y - 1 = -\frac{4}{3}x + \frac{4}{3}$
 $y = -\frac{4}{3}x + \frac{4}{3} + 1$
 $y = -\frac{4}{3}x + \frac{7}{3}$

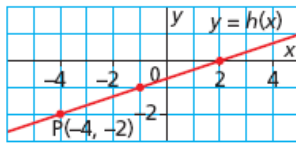
$y - y_1 = m(x - x_1)$
 $y - 7 = -1(x + 4)$
 $y - 7 = -x - 4$
 $y = -x - 4 + 7$
 $y = -x + 3$

a) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4}{2} = 2$

Point $(3, -2)$ $y + 2 = 2(x + 3)$
 $(-2, 2)$ $y = 2(x + 3)$
 $(-1, 2)$ $y - 2 = 2(x + 1)$
 $(0, 4)$ $y - 4 = 2(x - 1)$
 $(1, 6)$ $y - 6 = 2(x - 1)$

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

iii)



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

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

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

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

$$y + 2 = \frac{1}{3} x + \frac{4}{3}$$

$$y = \frac{1}{3} x + \frac{4}{3} - 2$$

$$y = \frac{1}{3} x + \frac{4}{3} - \frac{6}{3}$$

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

x intercept

$$0 = \frac{1}{3} x - \frac{2}{3}$$

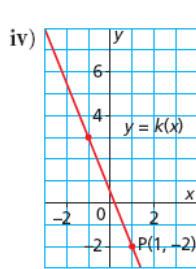
$$\frac{2}{3} = \frac{1}{3} x$$

$$6 = 3x$$

$$x = 2$$

y intercept

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



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

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

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

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

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

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

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

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

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

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

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

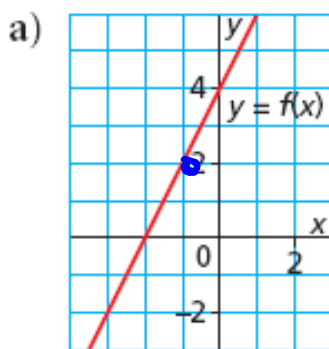
$$y = -2x - 10 - 5$$

$$y = -2x - 15$$

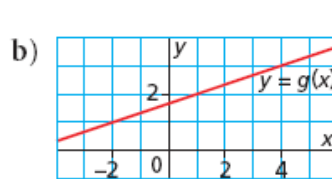
Slope Intercept form



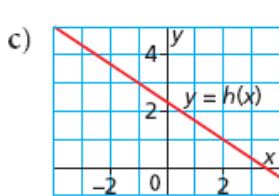
14. Match each graph with its equation. Justify your choice.



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



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



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

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

point

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 $y + 3 = -\frac{4}{3}(x + 5)$ $y + 3 = -\frac{4}{3}x - \frac{20}{3}$

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

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

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

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

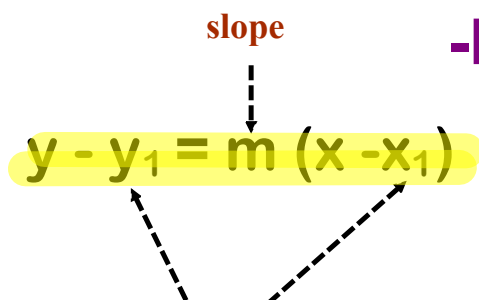
$$4y = 3x + 3$$

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

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:

You need a
-Point & a Slope

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


The x and y values from the given point

This equation can be rearranged
to $y = mx + b$
(slope intercept)

Example 1:

Find the equation of a line that passes through the points $(-4, 3)$ and a has a slope **perpendicular** to $y = 2x - 7$

$$m = 2$$

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

$$\begin{matrix} x_1 & y_1 \\ (-4, & 3) \end{matrix}$$

Write what you know:

What do we need:

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

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

have need have

add opp

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

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

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

+3 +3

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

Example 2:

Find the equation of a line that passes through the points (0,5) and (-2,1)

Write what you know:

Point A
(0,5)
 x_2, y_2

Point B
(-2,1)
 x_1, y_1

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

$$= \frac{5 - 1}{0 - (-2)}$$

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

$$\frac{1 - 5}{-2 - 0} = \frac{-4}{-2} = +2$$

What do we need:

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

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

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

$y - 1 = 2x + 4$

$y = 2x + 5$

$$m = +2$$

See next page "if you use other point)

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

$$y - 5 = 2(x - 0)$$

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

$$y = 2x + 5$$

What if you use the other point????

Example 2:

Find the equation of a line that passes through the points (0,5) and (-2,1)

Write what you know:

Fill in what you know:

$$(0,5) \quad m = ?$$

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

$$y = 2x + 5$$

We need slope:

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

$$m = \frac{(1 - 5)}{((-2) - 0)}$$

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

$$m = 2$$

Fill in what you know:

$$(-2, 1) \quad m = 2$$

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

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

$$y - 1 = 2x + 4$$

$$y - 1 + 1 = 2x + 4 + 1$$

$$y = 2x + 5$$

3

When looking for the **x**-intercept
in an equation,

let

x equal zero.



INTERCEPTS

When looking for the **y**-intercept
in an equation,

let

x equal zero.



$$4x - 5y = 40$$

$$\begin{aligned} -5y &= -4x + 40 \\ y &= \frac{4}{5}x - 8 \end{aligned}$$

Let $y = 0$ for the x-intercept.

$$\begin{aligned} 4x - 5y &= 40 \\ 4x - 5(0) &= 40 \\ 4x - 0 &= 40 \\ \frac{4x}{4} &= \frac{40}{4} \\ x &= 10 \\ (10, 0) & \end{aligned}$$



Can you see the intercepts?

Let $x = 0$ for the y-intercept.

$$\begin{aligned} 4x - 5y &= 40 \\ 4(0) - 5y &= 40 \\ 0 - 5y &= 40 \\ -5y &= 40 \\ y &= -8 \\ (0, -8) & \end{aligned}$$

Test Tuesday Dec. 13

Homework:

Worksheet on Point-Slope form



Worksheet
Point Slope Form

Please put final answer in Slope-Intercept Form

- 1) Find the equation of a line that passes through the points $(-1, 8)$ and has a slope of 2.
- 2) Find the equation of a line that passes through the points $(6, -3)$ and has a slope of $m=4$.
- 3) Find the equation of the straight line that has slope $m = \frac{3}{4}$ and passes through the point $(-1, -6)$.
- 4) Find the equation of a line that passes through $(-1, 1)$ and has the same slope as $y = -3x + 4$.
- 5) Find the equation of a line that passes through $(-7, 3)$ and has the same slope as $y = 2x + 1$.
- 6) Find the equation of a line that passes through the points $(3, -2)$ and $(-4, 1)$
- 7) ~~Find the equation of a line that passes through the points $(3, -2)$ and $(-4, 1)$~~
- 8) Find the equation of a line that has the same x-intercept as this equation $2x + 6 = 3y$, and also passes through the point $(4, 5)$.

New

Attachments

Point slope form.docx