Warm Up

1) Given (-1,4) and (5,-2), write an equation for the line in:

$x_1 \, y_1 \qquad x_2 \, y_2$

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

a) Point slope $y - y_1 = m(x - x_1)$

$\boxed{y + 2 = -1(x - 5)}$ or $\quad y - 4 = -1(x - -1)$

$\qquad \qquad \qquad \qquad \boxed{y - 4 = -1(x + 1)}$

$= \dfrac{-2 - 4}{5 - -1}$

b) Slope Intercept

$\qquad \qquad y = mx + b$

$\qquad \qquad y - 4 = -1(x + 1)$

$= \dfrac{-2 - 4}{5 + 1}$

c) General

$Ax + By + C = 0$

$1x + y - 3 = 0$

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

$\boxed{y = -1x + 3}$

$= \dfrac{-6}{6}$

$\boxed{m = -1}$

2) Given 3x - 4y = 12, find

$y = mx + b$

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

$Ax + By + C = 0$

a) Slope

b) Y- Intercept

original equation

c) X-Intercept → let y = 0

$3x - 4y = 12$

$3x - 4(0) = 12$

$3x - 0 = 12$

b) $3x - 4y = 12 \overset{-3x}{}$ (with $-3x$ crossed)

$\dfrac{-4y}{-4} = \dfrac{-3x}{-4} + \dfrac{12}{-4}$

$\dfrac{3x}{3} = \dfrac{12}{3}$

$\boxed{x = 4}$

$\boxed{y = \dfrac{3}{4}x - 3}$

X int (4,0)

a) $m = \dfrac{3}{4}$

b) $b = -3$
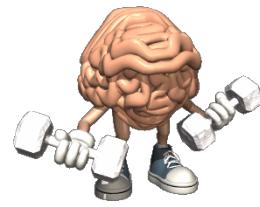
Warm Up

1) Given (-1,4) and (5,-2), write an equation for the line in:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2-4}{5--1} = \frac{-6}{6} = -1$$

a) Point slope

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

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

or

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

b) Slope Intercept $y = mx + b$

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

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

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

$$y = -1x + 3$$

c) General $Ax + By + C = 0$

$$\overset{+x}{y} = -x \overset{+x}{} + 3$$

$$x + y \overset{-3}{=} 3 \overset{-3}{}$$

$$x + y - 3 = 0$$

Warm Up
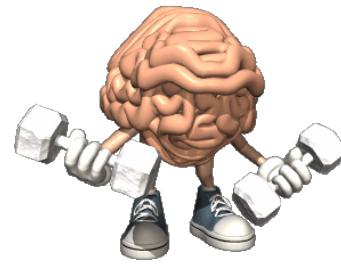
2) Given 3x-4y=12, find

a) Slope

$$3x - 4y = 12$$

$$-4y = -3x + 12$$
$$\frac{-4y}{-4} = \frac{-3x}{-4} + \frac{12}{-4}$$

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

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

b) Y- Intercept

$$= -3$$

$$(0, -3)$$

c) X-Intercept $= 4$

$$y = 0$$

$$3x - 4y = 12$$

$$3x - 4(0) = 12$$

$$3x = 12$$

$$x = 4$$

$$(4, 0)$$

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

$$m = 2$$

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

Write what you know:

What do we need:

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

have   need   have

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

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

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

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

$$2y - 6 = -1x - 4$$

$$2y - 6^{+6} = -1x - 4^{+6}$$

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

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

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

Example 3:
Find the equation of a line that passes through the points (8,-3) and (6,1), and has a y intercept of (0,-7)

$$b = -7$$

$$y = mx + b$$

$$y = -2x - 7$$

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

$$= \frac{1 - -3}{6 - 8}$$

$$= \frac{1 + 3}{6 - 8}$$

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

$$M = -2$$

3

When looking for the x-intercept
in an equation,
let
y equal zero.

INTERCEPTS

When looking for the y-intercept
in an equation,
let
x equal zero.

$$4x-5y=40$$

Can you see the intercepts?

$$4x - 5y = 40$$

Let y = 0 for the x-intercept.

$$4x - 5(0) = 40$$

$$\frac{4x}{4} = \frac{40}{4}$$

$$x = 10$$

$$(10, 0)$$

Let x = 0 for the y-intercept.

$$4x - 5y = 40$$

$$4(0) - 5y = 40$$

$$\frac{-5y}{-5} = \frac{40}{-5}$$

$$(y = -8)$$

$$(0, -8)$$

5

Find the value of the x-intercept.

2.

$$3x + 10y - 40 = -10$$

$3x + 10(0) - 40 = -10$

$3x - 40 \overset{+40}{=} -10 \overset{+40}{}$

$\dfrac{3x}{3} = \dfrac{30}{3}$

$(10, 0)$ $(x = 10)$

Write an equation of a line (in slope y-intercept form) given the following information,

$y = mx + b$

1) x-intercept = 2, slope = 3/2

$(2, 0) \quad m = \frac{3}{2}$

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

$y - 0 = \frac{3}{2}(x - 2)$

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

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

2) points (3, 1) & (-2, 3) lie on the line.

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

$= \dfrac{3 - 1}{-2 - 3}$

$\boxed{m = \dfrac{2}{-5}} \quad (3, 1)$

$y - 1 = \dfrac{-2}{5}(x - 3)$

$5 \cdot \left[y - 1 \right] = \left[\dfrac{-2}{5}(x - 3) \right] \times 5$

$5(y - 1) = -2(x - 3)$

$5y - 5 = -2x + 6 \quad ^{+5}$

$\dfrac{5y}{5} = \dfrac{-2x}{5} + \dfrac{11}{5}$

$\boxed{y = \dfrac{-2}{5}x + \dfrac{11}{5}}$

CHECK YOUR UNDERSTANDING

4. Write an equation for the line that passes through $S(2, -3)$ and is:

   a) parallel to the line $y = 3x + 5$

$$M = 3$$

$$m_{//} = 3$$

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

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

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

   b) perpendicular to the line $y = 3x + 5$

$$S(2, -3)$$

$$M = 3$$

$$m\perp = \frac{-1}{3}$$

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

6.5 Slope-Point Form of the Equation for a Linear Function

Homework

Page 384-385:
Questions: 4,5(a,b),
6(a,b) ,12(a,b), 18(a,b)
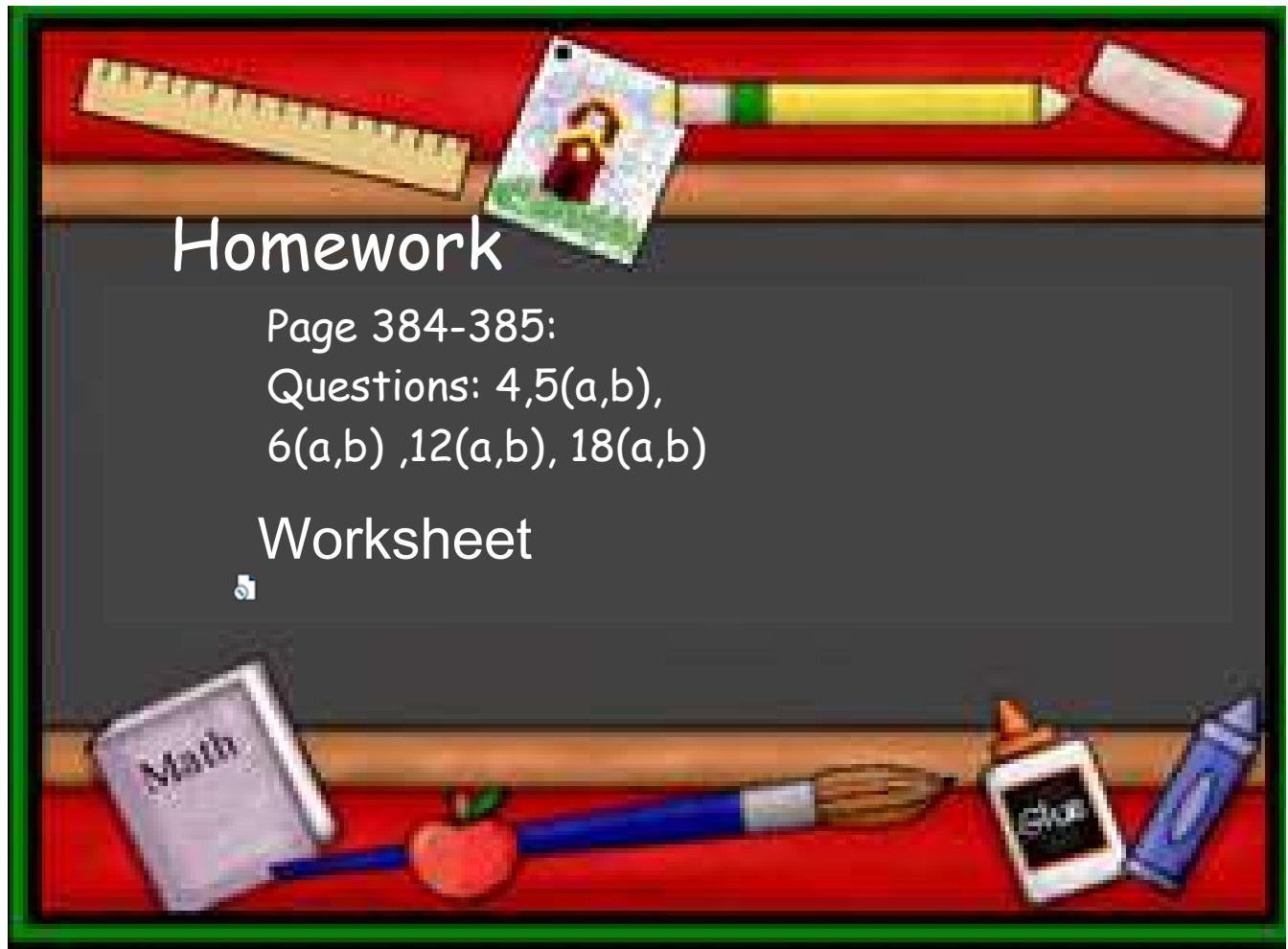
Worksheet

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)~~   New

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).

4. In which form is each equation written?

a) $8x - 3y = 52$

Standard

b) $9x + 4y + 21 = 0$

General

c) $y = 4x + 7$

Slope Intercept

d) $y - 3 = 5(x + 7)$

Point Slope

6.6 General Form of the Equation for a Linear Relation

5. Determine the x-intercept and the y-intercept for the graph of each equation.

a) $8x - 3y = 24$

$\underline{x\text{int}} \rightarrow y=0$	$y\text{int} \rightarrow x=0$
$8x - 3(0) = 24$	$8(0) - 3y = 24$
$8x = 24$	$-3y = 24$
$x = \dfrac{24}{8}$	$y = \dfrac{24}{-3}$
$x = 3$	$y = -8$
$(3, 0)$	$(0, -8)$

b) $7x + 8y = 56$

$\underline{x\text{int}} \rightarrow y=0$	$y\text{int} \rightarrow x=0$
$7x + 8(0) = 56$	$7(0) + 8y = 56$
$7x = 56$	$8y = 56$
$x = \dfrac{56}{7}$	$y = \dfrac{56}{8}$
$\boxed{x = 8}$	$y = 7$
$(8, 0)$	$(0, 7)$

c) $4x - 11y = 88$

$x$int $\rightarrow y=0$	$y$int $\rightarrow x=0$
$4x - 11(0) = 88$	$4(0) - 11y = 88$
$4x = 88$	$-11y = 88$
$x = \dfrac{88}{4}$	$y = \dfrac{88}{-11}$
$x = 22$	$y = -8$
$(22, 0)$	$(0, -8)$

d) $2x - 9y = 27$

$x$int $\rightarrow y=0$	$y$int $\rightarrow x=0$
$2x - 9(0) = 27$	$2(0) - 9y = 27$
$2x = 27$	$-9y = 27$
$x = \dfrac{27}{2}$	$y = \dfrac{27}{-9}$
	$y = -3$
$\left(\dfrac{27}{2}, 0\right)$	$(0, -3)$

6. Write each equation in general form.

a) $4x + 3y = 36$ -36 -36

$4x + 3y - 36 = 0$

b) $2x - y = 7$ -7 -7

$2x - y - 7 = 0$

c) $y = -2x + 6$

$2x + y - 6 = 0$

d) $y = 5x - 1$

$5x - y - 1 = 0$

$-2x - y + 6 = 0$

$2x + y - 6 = 0$

6.6 General Form of the Equation for a Linear Relation

7. Graph each line.

a) The x-intercept is 2 and the y-intercept is −3.

$(2,0)$ $(0,-3)$

$m = \dfrac{3}{2}$
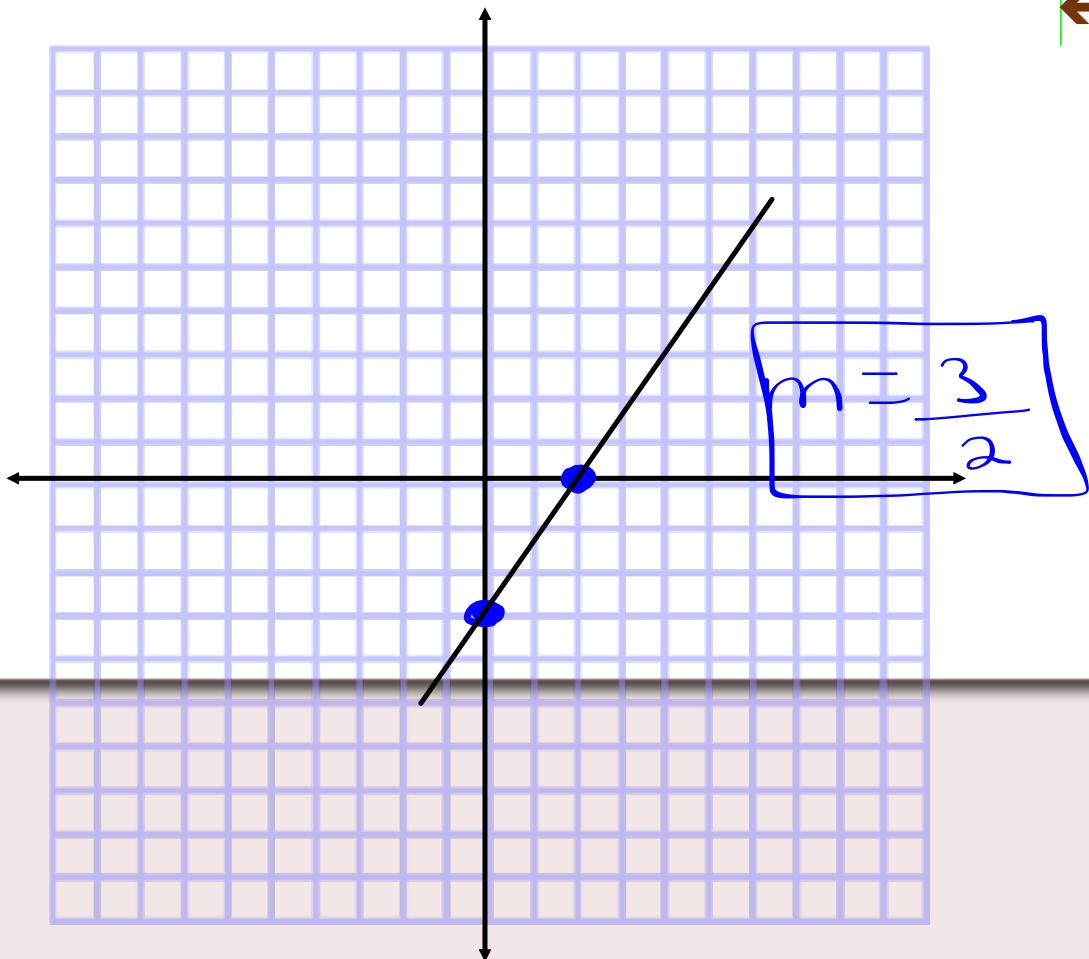
b) The x-intercept is -6 and the y-intercept is 2.

$$(-6, 0) \qquad (0, 2)$$

$$m = \frac{2}{6} = \frac{1}{3}$$
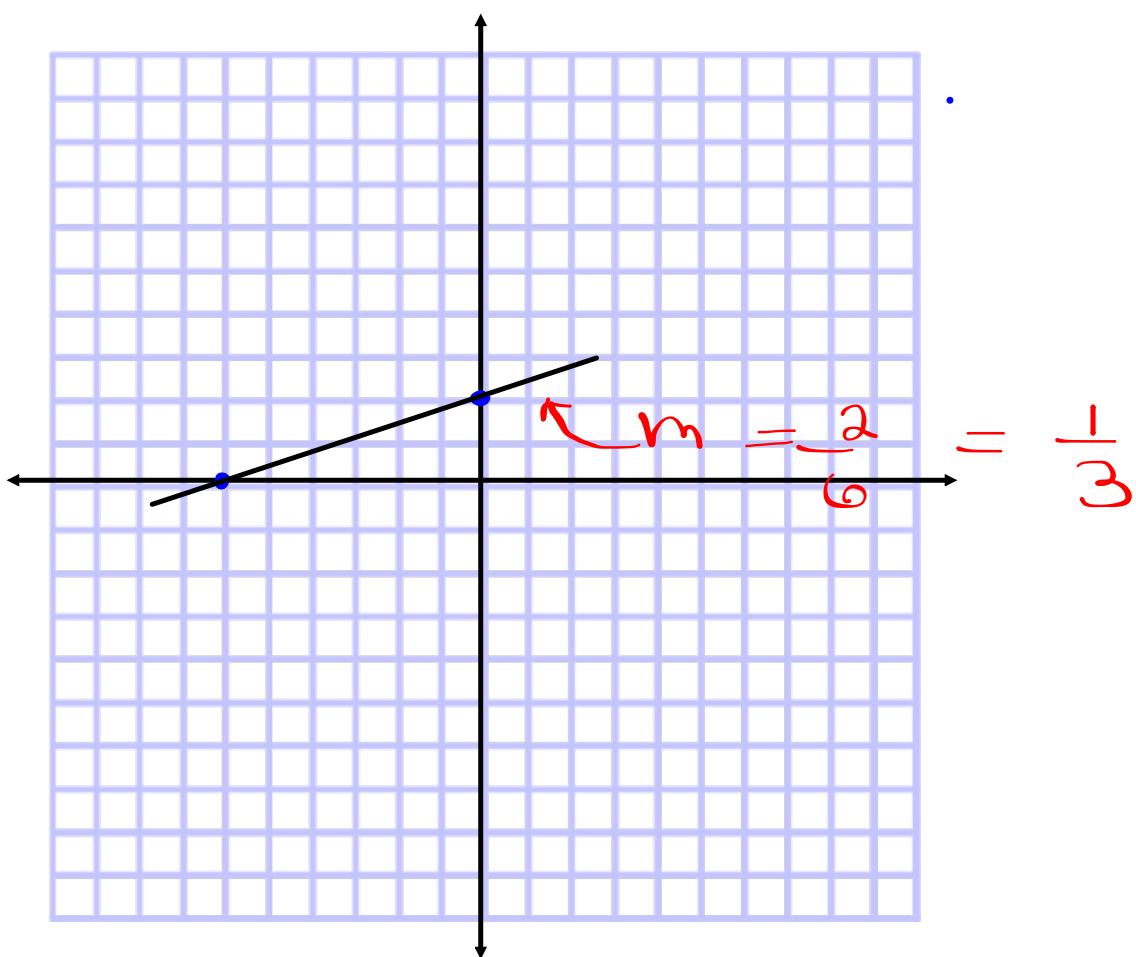
9. For each equation below:
    i) Determine the x- and y-intercepts of the graph of the equation.
    ii) Graph the equation.
    iii) Verify that the graph is correct.

$x=0$

$y=0$ ↑   ↑

9. a)   i) x-intercept: 8; y-intercept: –6   b)   i) x-intercept: –10; y-intercept: 12
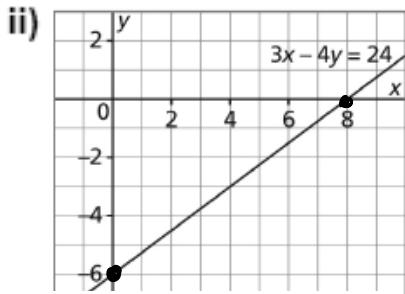
$(-10, 0)$ $(0, 12)$

ii)

$3x = 24$

$x = 8$

$(8, 0)$

3x – 4y = 24

a) $3x - 4y = 24$

b) $6x - 5y = -60$

$-4y = 24$

$y = -6$

$(0, -6)$

6x – 5y = –60

ii)
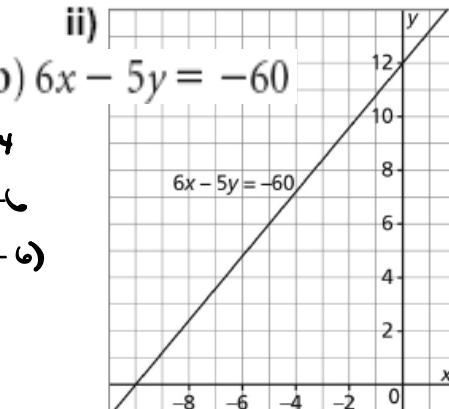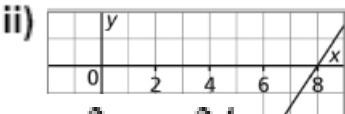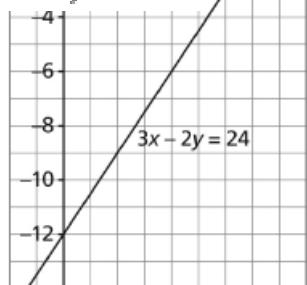
c)   i) x-intercept: 8; y-intercept: –12   d)   i) x-intercept: 2; y-intercept: –10

ii)

c) $3x - 2y = 24$

3x – 2y = 24

d) $5x - y = 10$

ii)
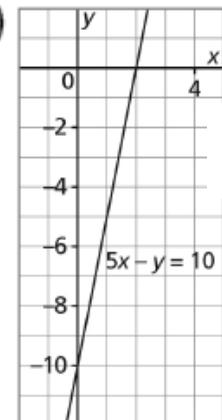
5x – y = 10

$y = mx + b$

12. Write each equation in slope-intercept form.

a) $4x + \boxed{3y} - 24 = 0$

$3y = -4x + 24$

$y = \dfrac{-4x}{3} + \dfrac{24}{3}$

$\boxed{y = \dfrac{-4}{3}x + 8}$

b) $3x - 8y + 12 = 0$

$-8y = -3x - 12$

$y = \dfrac{-3}{-8}x - \dfrac{12}{-8}$

$\boxed{y = \dfrac{3}{8}x + \dfrac{3}{2}}$

c) $2x - 5y - 15 = 0$

$-5y = -2x + 15$

$y = \dfrac{-2x}{-5} + \dfrac{15}{-5}$

$\boxed{y = \dfrac{2}{5}x - 3}$

d) $7x + 3y + 10 = 0$

$3y = -7x - 10$

$\boxed{y = \dfrac{-7}{3}x - \dfrac{10}{3}}$

18

Point-slope to General form

b) $y - 1 = \dfrac{3}{5}(x + 2)$

Example 2   Graphing a Line in General Form

a) Determine the x- and y-intercepts of the line whose equation is: $3x + 2y - 18 = 0$

✓ **SOLUTION**

6.6 General Form of the Equation for a Linear Relation

Example 2 Graphing a Line in General Form

a) Determine the x- and y-intercepts of the line whose equation is: $3x + 2y - 18 = 0$

b) Graph the line.

c) Verify that the graph is correct.

---

a) To determine the x-intercept:

$3x + 2y - 18 = 0$ Substitute: $y = 0$

$3x + 2(0) - 18 = 0$ Solve for x.

$3x = 18$

$\dfrac{3x}{3} = \dfrac{18}{3}$

$x = 6$

The x-intercept is 6 and is described by the point $(6, 0)$.

To determine the y-intercept:

$3x + 2y - 18 = 0$ Substitute: $x = 0$

$3(0) + 2y - 18 = 0$ Solve for y.

$2y = 18$

$\dfrac{2y}{2} = \dfrac{18}{2}$

$y = 9$

b) On a grid, plot the points that represent the intercepts. Draw a line through the points.
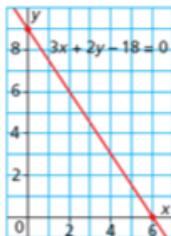
c) The point $T(2, 6)$ appears to be on the graph.
Verify that $T(2, 6)$ satisfies the equation.
Substitute $x = 2$ and $y = 6$ in the equation $3x + 2y - 18 = 0$.

L.S. $= 3x + 2y - 18$ R.S. $= 0$

$= 3(2) + 2(6) - 18$

$= 6 + 12 - 18$

$= 0$

Since the left side is equal to the right side, the point satisfies the equation and the graph is probably correct.

Add to notes

Write the following in GENERAL form

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

Homework

Test Review Day 1
WORKSHEET
Questions: All Questions
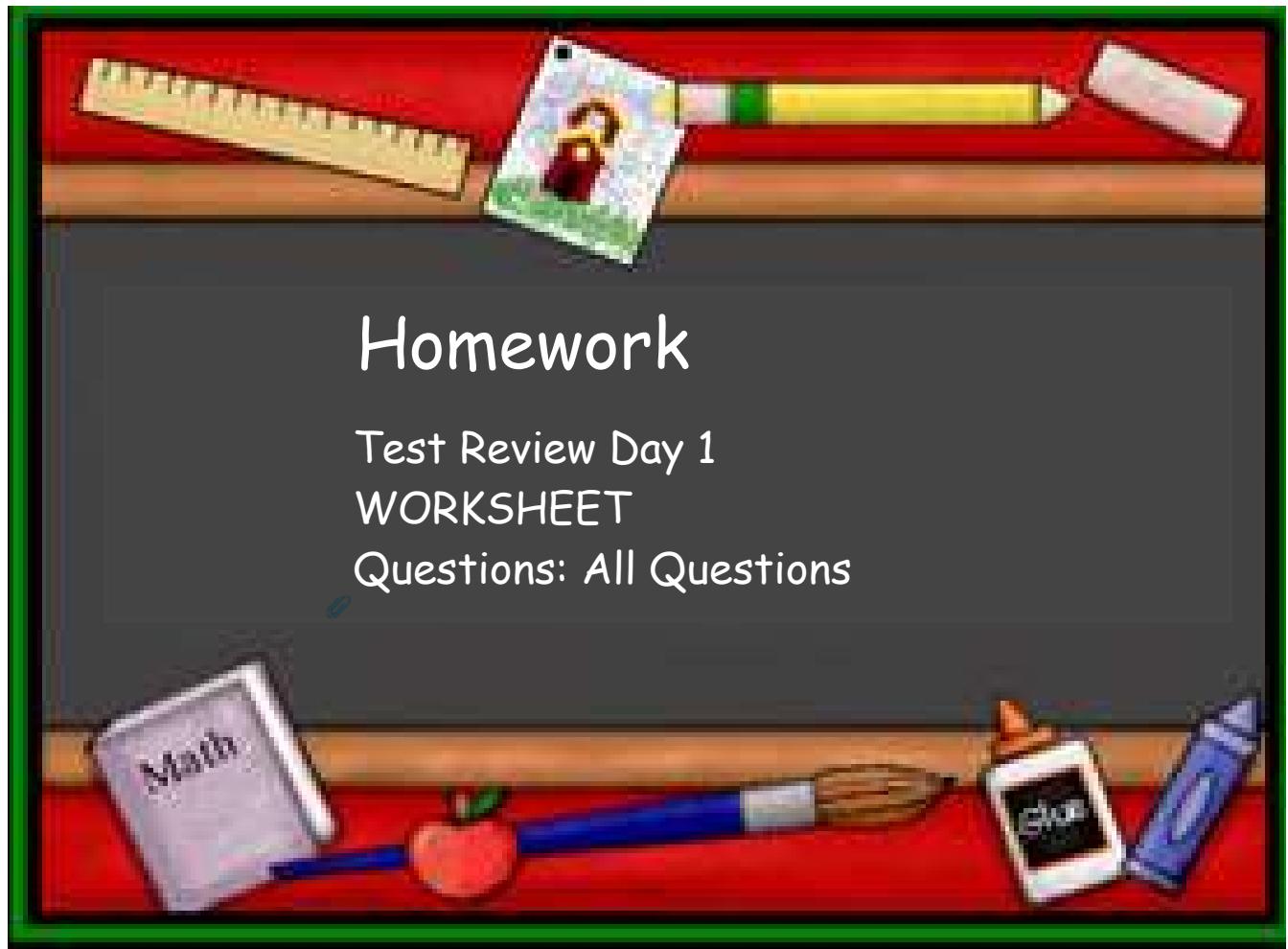
Attachments

Chapter 6 Linear Functions Day 9 WORKSHEET TEST REVIEW.notebook

Point slope form.docx