Section Topics

Find the Slope of a line (from a graph or from two points)

Identify the slope and y-intercept (*m* and *b*)

Graph a line in Slope-Intercept Form. (y = mx + b)

Rewrite lines into Slope-Intercept Form. (y = mx + b)

Identify lines in Slope-Intercept Form and Standard Form

(y = mx + b)   (ax + by = c)

Identify the x and y-intercepts. (ax + by = c)

Graph a line in Standard Form   (ax + by = c)

Rewrite lines into Standard Form. (ax + by = c)

Writing Equations in Slope-Intercept Form.   (y=mx +b)

Find the Slope of a line

Find the slope between the given points.   use $\dfrac{y_2-y_1}{x_2-x_1} = m$

A)   (3, -4) and (-5, -6)

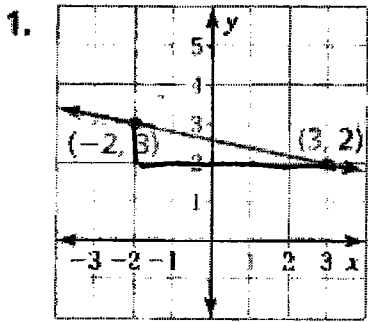$$m = \frac{-6-(-4)}{-5-3} = \frac{-2}{-8} = \frac{1}{4}$$

B) (-1, 3) and (-7, -5)

$$m = \frac{-5-3}{-7-(-1)} = \frac{-8}{-6}$$

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

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

Find the slope of the line.

1.

(−2, 3)   (3, 2)

$m = -\dfrac{1}{5}$

2.

(2, 1)

(−4, −1)

$m = \dfrac{1}{3}$

3.

(−3, 1)

(−5, −4)
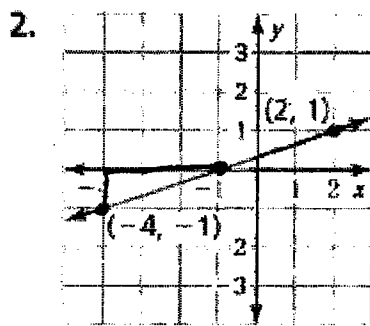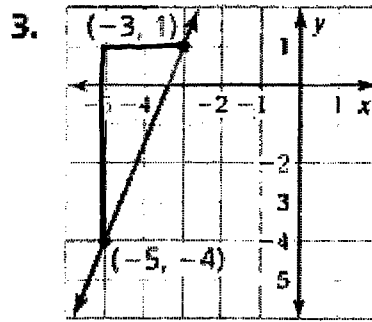
$m = \dfrac{5}{2}$

Graphing Linear Equations in Slope-Intercept Form

A) $y = \dfrac{2}{3}x - 2$

$m = \underline{\dfrac{2}{3}}$ y-intercept: $\underline{-2}$

B) $y = \dfrac{-3}{2}x + 4$
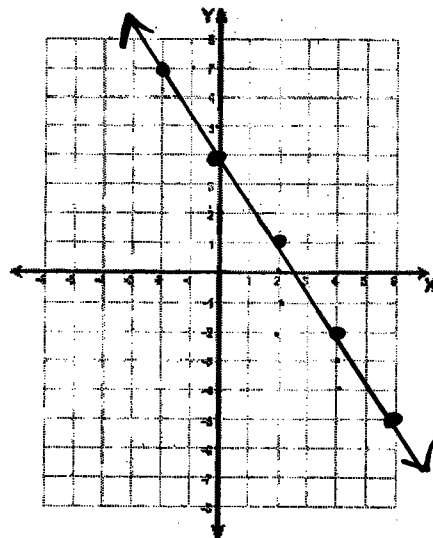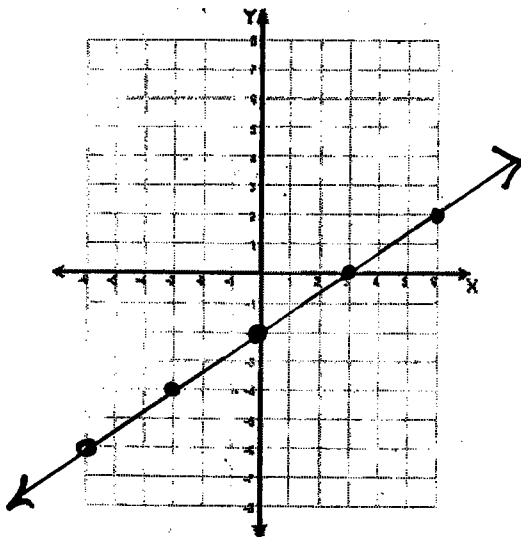
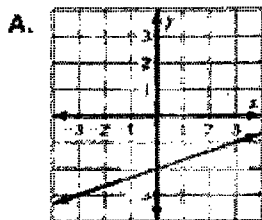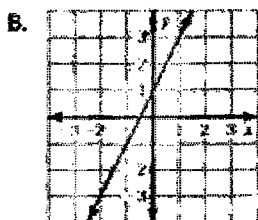$m = \underline{-\dfrac{3}{2}}$ y-intercept: $\underline{4}$

Practice and Problem Solving

Match the equation with its graph. **Identify the slope and the y-intercept.**

4. $y = 2x + 1$ B

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

6. $y = -\frac{2}{3}x + 1$ C

A.

B.

C.

4. m= 2 b= 1   **5.** m= $\frac{1}{3}$ b= -2   **6.** m= $-\frac{2}{3}$ b= 1

Rewrite lines into Slope-Intercept Form.   y = mx + b

a) $-4x + 2y = 8$

$\underline{+4x \qquad\qquad +4x}$

$\frac{2y}{2} = \frac{4x}{2} + \frac{8}{2}$

$\boxed{y = 2x + 4}$

b) $-4y - 32 = 2x$

$\underline{\quad +32 \qquad +32}$

$\frac{-4y}{-4} = \frac{2x}{-4} + \frac{32}{-4}$

$\boxed{y = -\frac{1}{2}x - 8}$

c) $7y - 2x = 42$

$\underline{\quad +2x \quad +2x}$

$\frac{7y}{7} = \frac{2x}{7} + \frac{42}{7}$

$\boxed{y = \frac{2}{7}x + 6}$

d) $27 = -3x - 9y$

$\underline{+3x \quad +3x}$

$\frac{3x + 27}{-9} = \frac{-9y}{-9}$

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

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

Identify lines in Slope-Intercept Form and Standard Form.

1) Which of the following is written in <u>standard form</u>?

   A. $8x + 7 = 9y$

   (B.) $-2x - 3y = 20$

   C. $y = -5x + 6$

   D. $5 = 2x - 3y$ oK

2) Which of the following is written in <u>standard form</u>?

   A. $y = 4x - 7$

   B. $\frac{1}{3}x + 4 = \frac{2}{5}y$

   (C.) $x + y = -18$

   D. $-4 + 15x = y$

3) Which of the following is in <u>slope-intercept form</u>?

   A. $x = 3y + 6$

   (B.) $y = -2x + 9$

   C. $y - 18 = 2x$

   D. $2x + 3y = 6$

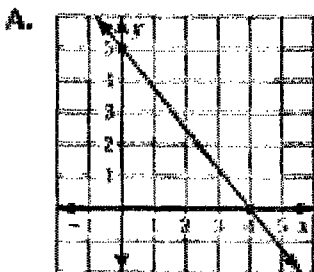**4)** Which of the following is in <u>slope-intercept form</u>?

   A. $7x - 10y = 12$

   B. $\frac{1}{3}x + 2y = \frac{2}{5}$

   C. $6y = 4 + 5x$

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

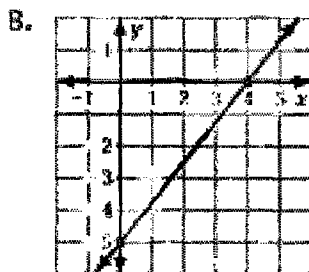
Match the equation with its graph.

11. $15x - 12y = 60$

12. $5x + 4y = 20$

13. $10x + 8y = -40$

A.

x int = 4
y int = -5

$\boxed{B}$

B.

x int = 4
y int = 5

$\boxed{A}$

C.
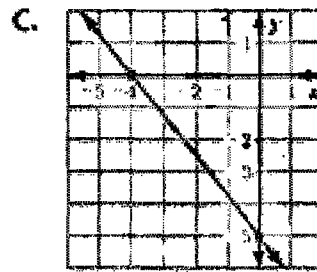
x int = -4
y int = -5

$\boxed{C}$

Identify the x and y intercepts.

Find the x-intercept and y-intercept for each equation.
(Substitute 0 for x and y, or use the "finger" method)

a) $-9x - 2y =$ ~~48~~ 36

x-int: __−5__ y-int: __−18__

b) $3x - 6y = -24$

x-int: __−8__ y-int: __4__

c) $3x - 2y = -12$

x-int: __−4__ y-int: __6__

d) $10x + 2y = -30$

x-int: __−3__ y-int: __−15__
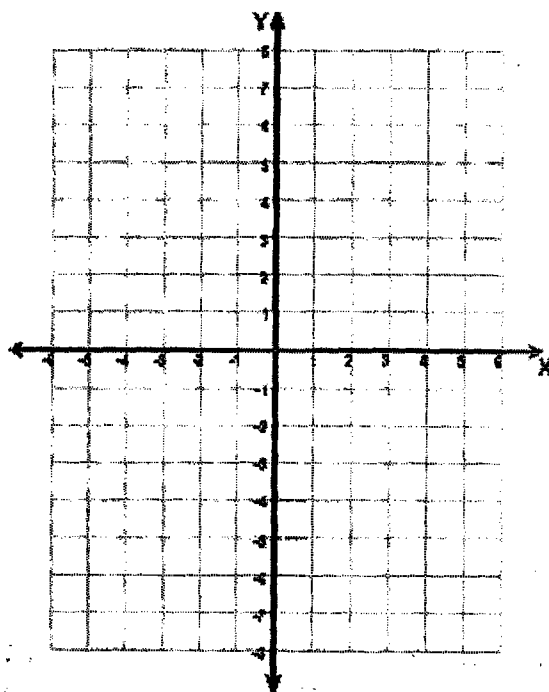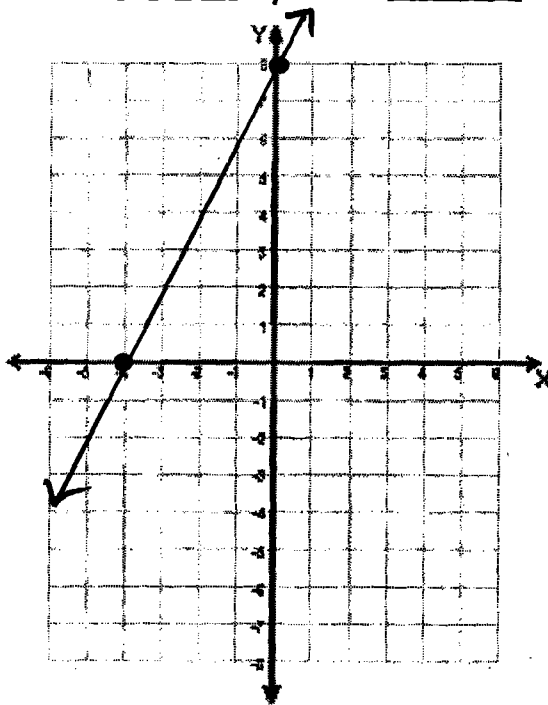
Graph a line in Standard Form

GRAPH the equations using the x-intercept and the y-intercept.

a) $-10x + 5y = 40$

b) $10y - 20x =$ ~~80~~ -60

x-int: __−4__ y-int: __8__   x-int: __−8__ y-int: __4__

Rewrite lines into Standard Form. $ax + by = c$

a) $2y = -5x - 18$
   $+5x \quad +5x$
   _____
   $\boxed{5x + 2y = -18}$

b) $12 - 6x = 3y$
   $+6x \quad +6x$
   _____
   $12 = 6x + 3y$
   $\boxed{6x + 3y = 12}$

c) $3y = -3x + 18$
   $+3x \quad +3x$
   _____
   $\boxed{3x + 3y = 18}$

d) $2x - 21 = 7y$
   $-2x \qquad -2x$
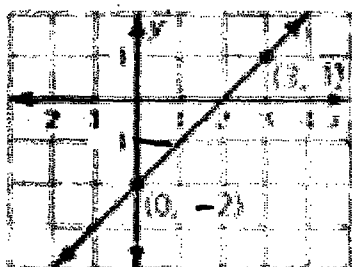   _____
   $-21 = -2x + 7y$
   $\boxed{-2x + 7x = -21}$

Write an equation of the line in slope-intercept form (pg 195)

Write an equation of the line in slope-intercept form.
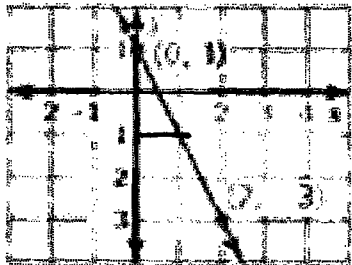
20. $m = 1 \ b = -2$

$\boxed{y = x - 2}$

21. $m = -\frac{1}{2}$
$b = 4$

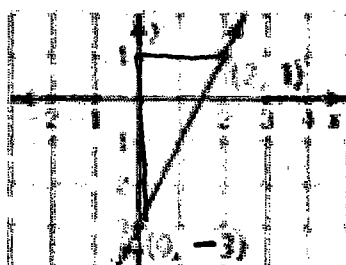$\boxed{y = -\frac{1}{2}x + 4}$

22.

$m = -2 \ b = 1$

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

23.

$m = \frac{4}{2} = \frac{2}{1} = 2$

$b = -3$

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

Write an equation of the line in slope-intercept form

A) Write an equation of the line that passes through the points (4, -3) and (0, -1)

$$m = \frac{-1 - (-3)}{0 - 4} = \frac{2}{-4} = -\frac{1}{2}$$

$$b = -1$$

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

B) Write an equation of the line that passes through the points (0, 1) and (5, -3)

$$b = 1$$

$$m = \frac{-3 - 1}{5 - 0} = \frac{-4}{5}$$

$$y = -\frac{4}{5}x + 1$$

C) Write an equation of the line that passes through the points (-1, -1) and (1, 5)

$$m = \frac{5 - (-1)}{1 - (-1)} = \frac{6}{2} = 3$$

I chose (1, 5)
  x y

$$y = 3x + 2$$

$$y = mx + b$$
$$5 = 3(1) + b$$
$$5 = 3 + b$$
$$\underline{-3 \quad -3}$$
$$b = 2$$

D) Write an equation of the line that passes through the points (-9, 5) and (-3, 3)

$$m = \frac{3 - 5}{-3 - (-9)} = \frac{-2}{6} = -\frac{1}{3}$$

I chose (-9, 5)
  x y

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

$$5 = -\frac{1}{3}(-9) + b$$
$$5 = 3 + b$$
$$\underline{-3 \quad -3}$$
$$2 = b$$

PAINTING: You used $90 worth of paint for a school float.

a. **Graph** the equation $18x + 15y = 90$, where x is the number of gallons of blue paint and y is the number of gallons of white paint.

b. **Interpret** the x and y-intercepts.

$$x\text{-int} \quad 18x = 90$$
$$x = 5 \longrightarrow$$

If you spend all $90 on only blue paint, (0 gallons of white) you can buy 5 gallons.

$$y\text{-int} \quad 15y = 90$$
$$y = 6 \longrightarrow$$

If you spend all $90 on only white paint (0 gallons of blue) you can buy 6 gallons.

CONSTRUCTION: A construction crew is extending a highway sound barrier that is 13 miles long. The crew builds $\frac{1}{2}$ of a mile per week. **Write an equation** that represents the length y (in miles) of the barrier after x weeks.

starting length

$$y = \frac{1}{2}x + 13$$

KITE: You are pulling your kite down at a rate of 2 feet per second. After 3 seconds, your kite is 54 feet above you.
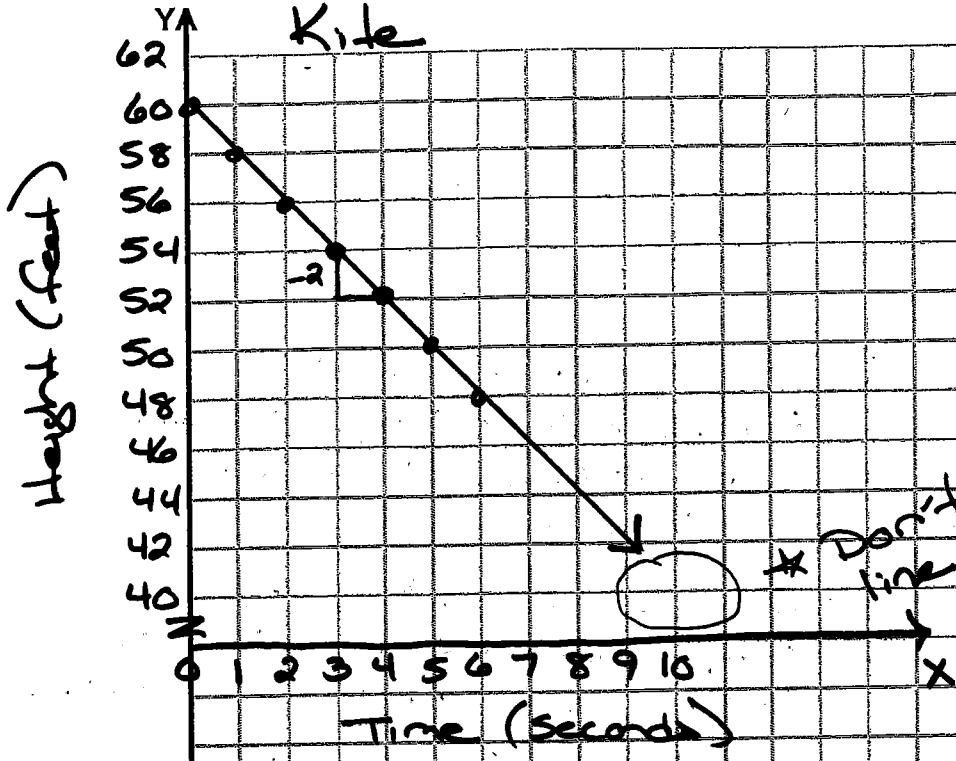
Negative slope $m = -2$

a. **Write and Graph an equation** that represents the height y (in feet) of the kite about you after x seconds.

b. At what height was the kite flying before you began pulling it down?

(3 seconds earlier the kite was 6 feet higher)

$$y = -2x + 60$$

Kite

Y

Height (Feet)

62
60
58
56
54
52
50
48
46
44
42
40

-2

Don't Extend Your
line into the part
You cut off!

0 1 2 3 4 5 6 7 8 9 10   X

Time (Seconds)

Paint

Gallons of white Paint

7
6
5
4
3
2
1

0 1 2 3 4 5 6 7

Gallons of Blue Paint