Name:___*Answer Key*_____

Teacher: _____    Period: _____

# Algebra I Part I
# Chapter 5 Packet

## Chapter 5

Unit Test Date: _____

Name _____    Date _____

# Practice B
*For use with pages 302–308*

**Write an equation in point-slope form of the line that passes through the given point and has the given slope *m*.**

**1.** $(1, 9)$; $m = -3$

$y - 9 = -3(x - 1)$

**2.** $(4, -10)$; $m = 2$

$y + 10 = 2(x - 4)$

**3.** $(-5, 6)$; $m = 4$

$y - 6 = 4(x + 5)$

**4.** $(-2, -8)$; $m = 3$

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

**5.** $(-4, -7)$; $m = -\frac{1}{2}$

$y + 7 = -\frac{1}{2}(x + 4)$

**6.** $(-9, 2)$; $m = -5$

$y - 2 = -5(x + 9)$

**7.** $(6, -4)$; $m = \frac{2}{3}$

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

**8.** $(0, 15)$; $m = \frac{4}{5}$

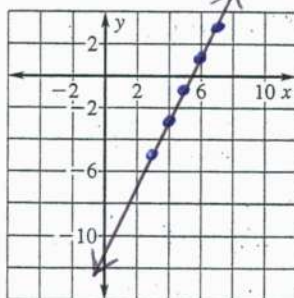$y - 15 = \frac{4}{5}(x - 0)$

**9.** $(-8, 0)$; $m = 2$

$y - 0 = 2(x + 8)$

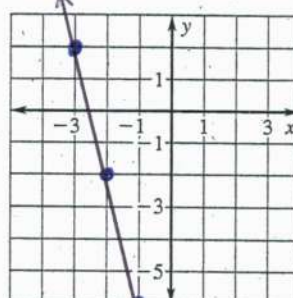**Graph the equation.**

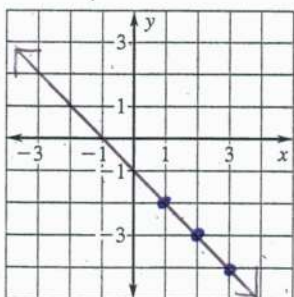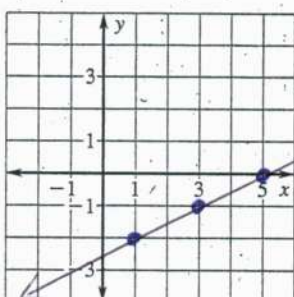**10.** $y - 6 = 3(x - 4)$
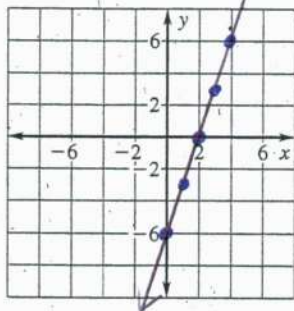
**11.** $y + 1 = 2(x - 5)$

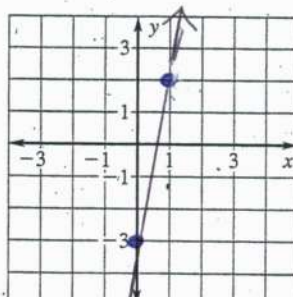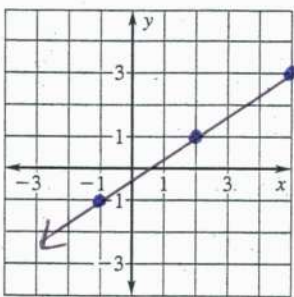**12.** $y - 2 = -4(x + 3)$

**13.** $y + 2 = -(x - 1)$

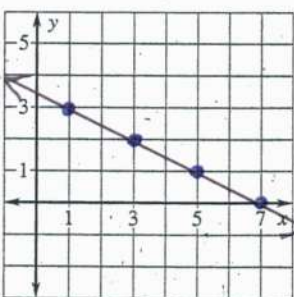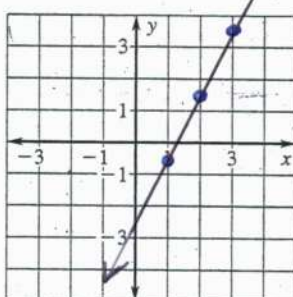**14.** $y = \frac{1}{2}(x - 5)$

**15.** $y + 3 = 5x$

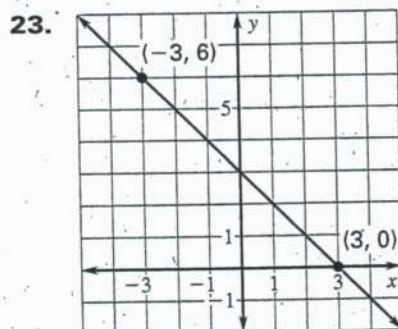**16.** $y + 1 = \frac{2}{3}(x + 1)$

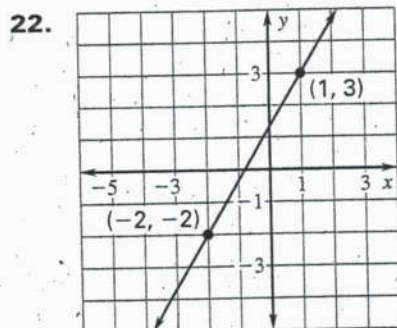**17.** $y - 2 = -\frac{1}{2}(x - 3)$

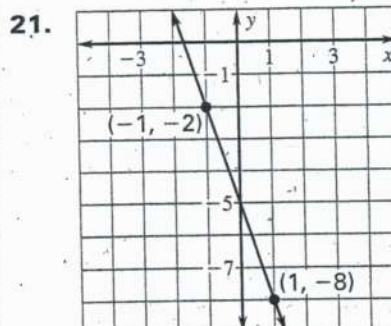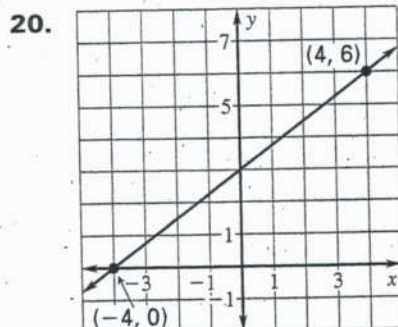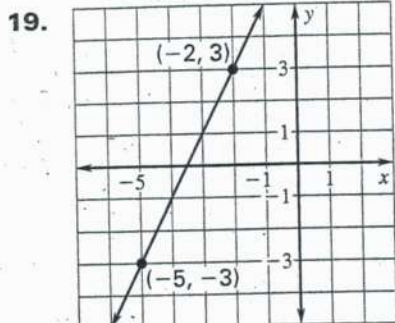**18.** $y + \frac{1}{2} = 2(x - 1)$

LESSON
5.3

**Practice B** continued
For use with pages 302–308

**Write an equation of the line shown.**

19. (handwritten)
$$19. \quad y-3=2(x+2)$$
$$y+3=2(x+5)$$
20. (handwritten)
$$20. \quad y=\frac{3}{4}(x+4)$$
$$y-6=\frac{3}{5}(x-4)$$
21. (handwritten)
$$21. \quad y+2=-3(x+1)$$
$$y+8=-3(x-1)$$
22. (handwritten)
$$22. \quad y-3=\frac{5}{3}(x-1)$$
$$y+2=\frac{5}{3}(x+2)$$

**19.**

(−2, 3)
(−5, −3)

**20.**

(4, 6)
(−4, 0)

**21.**

(−1, −2)
(1, −8)

**22.**

(1, 3)
(−2, −2)

**23.**

(−3, 6)
(3, 0)

**24.**

(0, 2)
(5, −3)

(handwritten side notes)
$$23. \quad y-0=-1(x-3)$$
$$y-6=-1(x+3)$$
$$24. \quad y-2=-1(x-6)$$
$$y+3=-1(x-5)$$
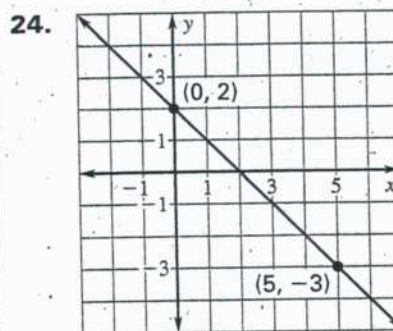
**Write an equation of the line that passes through the given points.**

**25.** (9, 4), (17, 6)
(handwritten)
$$y-4=\frac{1}{4}(x-9)$$
$$y-6=\frac{1}{4}(x-17)$$

**26.** (−3, 10), (4, 2)
(handwritten)
$$y-10=-\frac{8}{7}(x+3)$$
$$y-2=-\frac{8}{7}(x-4)$$

**27.** (3, −8), (7, −2)
(handwritten)
$$y+8=\frac{3}{2}(x-3)$$
$$y+2=\frac{3}{2}(x-7)$$

**28.** (−4, −4), (2, 5)
(handwritten)
$$y+4=\frac{3}{2}(x+4)$$
$$y-5=\frac{3}{2}(x-2)$$

**29. Bryce Canyon National Park** From 1990 to 2000, the number of visits by people to Bryce Canyon National Park increased by about 23.9 thousand visits per year. In 2000, there were about 1102.4 thousand visits to the park.

  **a.** Write an equation that gives the number of visits (in thousands) as a function of the number of years since 1990.   (handwritten) $y-1102.4=23.9(x-10)$

  **b.** How many visits were made to the park in 1995?   (handwritten) 982.9 thousand visits

**30. Airmail Letter Rates** The table shows the cost of mailing different weights of airmail letters to Canada in 2005.

| Weight (oz) | 2 | 3 | 4 | 8 |
|---|---|---|---|---|
| Cost (dollars) | 0.85 | 1.10 | 1.35 | 2.35 |

  **a.** *Explain* why the situation can be modeled using a linear equation.

  **b.** Write an equation that gives the cost (in dollars) as a function of the weight of an airmail letter (in ounces).   (handwritten) $y-0.85=0.25(x-2)$

  **c.** How much does it cost to mail a 5-ounce airmail letter to Canada?   (handwritten) $1.60

**31. New Mexico** The population density of New Mexico increased at a relatively constant rate from 1980 to 1999. In 1985, the population density was about 11.62 people per square mile. In 1999, the population density was about 14.28 people per square mile. Write an equation that gives the population density (in people per square mile) as a function of the number of years since 1980. What was the population density in 1990?

(handwritten)
$$y-11.62=0.19(x-5)$$
12.57 people per square mile

Algebra 1 Part 2                                        Name_____

# Writing Linear Equations in Point Slope Form                    Item_____

**Write the point-slope form of the equation of each line given the slope and y-intercept.**

1) Slope $= -\dfrac{7}{3}$,   y-intercept $= -2$

$$y + 2 = -\frac{7}{3}(x - 0)$$

2) Slope $= \dfrac{5}{4}$,   y-intercept $= 0$

$$y - 0 = \frac{5}{4}(x - 0)$$

3) Slope $= 7$,   y-intercept $= 2$

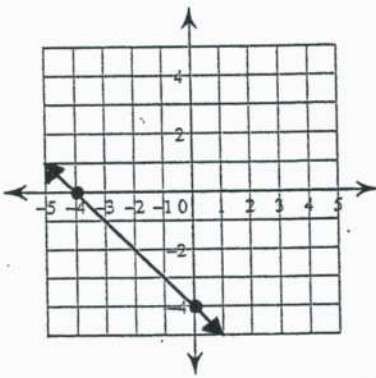$$y - 2 = 7(x - 0)$$

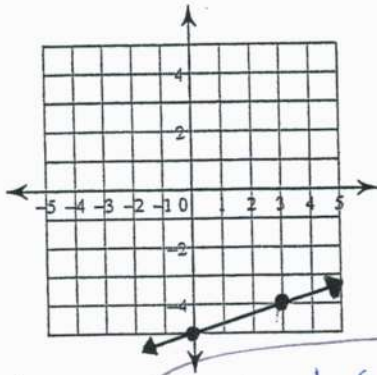4) Slope $= 2$,   y-intercept $= 3$

$$y - 3 = 2(x - 0)$$

**Write the point slope form of the equation of each line.**
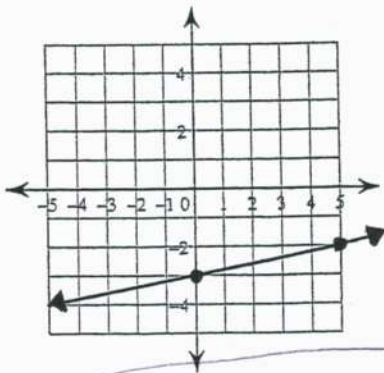
5)



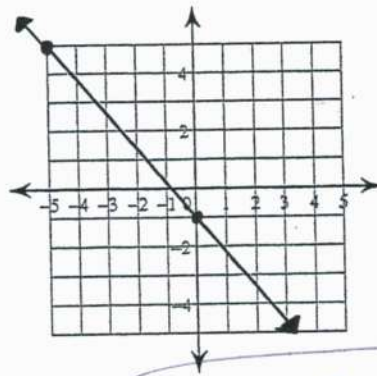$$y - 0 = -(x + 4)$$
$$y + 4 = -(x - 0)$$

6)



$$y + 5 = \frac{1}{3}(x - 0)$$
$$y + 4 = \frac{1}{3}(x - 3)$$

7)



$$y + 3 = \frac{1}{5}(x - 0)$$
$$y + 2 = \frac{1}{5}(x - 5)$$

8)



$$y - 5 = -\frac{6}{5}(x + 5)$$
$$y + 1 = -\frac{6}{5}(x - 0)$$

③

Write the point-slope form of the equation of the line through the given point with the given slope.

9) through: $(5, -2)$, slope $= -2$

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

10) through: $(5, 2)$, slope $= \dfrac{3}{7}$

$$y - 2 = \dfrac{3}{7}(x - 5)$$

11) through: $(5, 4)$, slope $= \dfrac{3}{8}$

$$y - 4 = \dfrac{3}{8}(x - 5)$$

12) through: $(5, -5)$, slope $= -\dfrac{5}{4}$

$$y + 5 = -\dfrac{5}{4}(x - 5)$$

13) through: $(-3, 0)$, slope $= 1$

$$y - 0 = 1(x + 3)$$

14) through: $(-2, -2)$, slope $= \dfrac{2}{3}$

$$y + 2 = \dfrac{2}{3}(x + 2)$$

Write the point-slope form of the equation of the line through the given points.

15) through: $(5, -4)$ and $(0, 3)$

$$y - 3 = -\dfrac{7}{5}(x + 0)$$
$$y + 4 = -\dfrac{7}{5}(x - 5)$$

16) through: $(0, 4)$ and $(2, 3)$

$$y - 4 = -\dfrac{1}{2}(x - 0)$$
$$y - 3 = -\dfrac{1}{2}(x - 2)$$

17) through: $(0, 5)$ and $(-2, 0)$

$$y - 5 = \dfrac{5}{2}(x - 0)$$
$$y - 0 = \dfrac{5}{2}(x + 2)$$

18) through: $(0, -5)$ and $(-4, 4)$

$$y + 5 = -\dfrac{9}{4}(x - 0)$$
$$y - 4 = -\dfrac{9}{4}(x + 4)$$

19) through: $(-5, 3)$ and $(0, -4)$

$$y - 3 = -\dfrac{7}{5}(x + 5)$$
$$y + 4 = -\dfrac{7}{5}(x - 0)$$

20) through: $(0, -4)$ and $(4, 2)$

$$y + 4 = \dfrac{3}{2}(x - 0)$$
$$y - 2 = \dfrac{3}{2}(x - 4)$$

21) through: $(-2, -5)$ and $(0, -3)$

$$y + 5 = 1(x + 2)$$
$$y + 3 = 1(x + 0)$$

22) through: $(5, -3)$ and $(0, -3)$

$$y + 3 = 0(x - 5)$$
$$y + 3 = 0(x - 0)$$
$$y = -3$$

(4)

Name _____     Date _____

# Practice B
*For use with pages 282–291*

**Write an equation of the line with the given slope and *y*-intercept.**
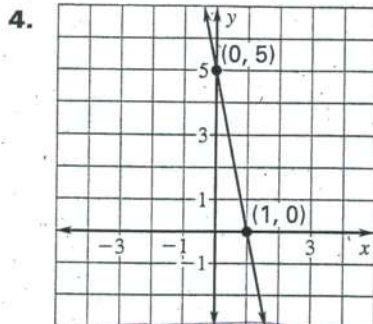
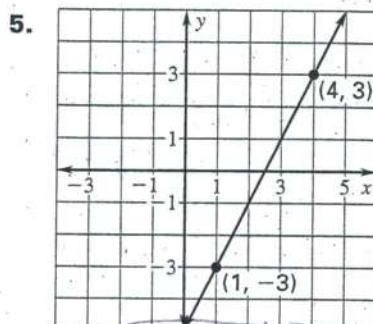1. slope: 7; *y*-intercept: 4   *(y = 7x + 4)*

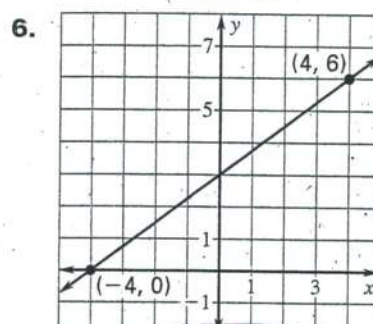2. slope: −3; *y*-intercept: 5   *(y = −3x + 5)*

3. slope: 1; *y*-intercept: −6   *(y = x − 6)*

**Write an equation of the line shown.**

4.

(0, 5)
(1, 0)
*(y = −5x + 5)*

5.

(4, 3)
(1, −3)
*(y = 2x − 5)*

6.

(4, 6)
(−4, 0)
*(y = ¾x + 3)*

**Write an equation of the line that passes through the given points.**

7. (−1, 0), (0, −2)   *(y = −2x − 2)*

8. (0, 4), (6, 13)   *(y = 3/2 x + 4)*

9. (4, 5), (8, 2)   *(y = −¾x + 8)*

10. (−1, −9), (6, 5)   *(y = 2x − 7)*

11. (2, −13), (−3, 12)   *(y = −5x − 3)*

12. (−4, −21), (1, −1)   *(y = 4x − 5)*

**Write an equation for the linear function *f* with the given values.**

13. $f(0) = -1, f(3) = -10$   *(f(x) = −3x − 1)*

14. $f(-4) = 5, f(2) = 2$   *(f(x) = −½x + 3)*

15. $f(-4) = -2, f(2) = 7$   *(f(x) = 3/2 x + 4)*

16. **Landscape Supply** A landscape supply business charges $30 to deliver mulch. The mulch costs $23 per cubic yard.

   a. Write an equation that gives the total cost (in dollars) of having mulch delivered to a site as a function of the number of cubic yards ordered.   *(y = 23x + 30)*

   b. *Identify* the dependent and independent variables in this situation.   *(dep = cost, ind. = #yards)*

   c. Find the cost of having 8 cubic yards of mulch delivered to a site.   *($214)*

17. **Cable Television** A cable company charges $44 per month for basic service. Each premium channel costs an additional $16 per month.

   a. Write an equation that gives the total cost (in dollars) of cable each month as a function of the number of premium channels.   *(y = 16x + 44)*

   b. *Identify* the dependent and independent variables in this situation.

   c. *Explain* how you can use the equation from part (a) to approximate how many premium channels you can have for $80 a month.

18. **Laser Printer** A laser printer has a "sleep" mode that is an energy-saving feature. When a job is sent to the printer, it takes 45 seconds for the printer to warm up and then the printer prints pages at a rate of 6 pages per minute.

   a. Write the time it takes the printer to warm up in minutes.   *(¾ minutes)*

   b. Write an equation that gives the total amount of time (in minutes) it takes the printer to warm up and print a job as a function of the number of pages in the job.   *(y = ⅙x + ¾)*

   c. Find out how long it takes the printer to print a 50-page job if it must first warm up.   *(≈ 9 minutes)*

⑤

LESSON 5.1

Name _____  Date _____

**Write an equation of the line that passes through the given point and has slope m.**

1. $(-1, 6)$; $m = 5$   $\boxed{y = 5x + 11}$
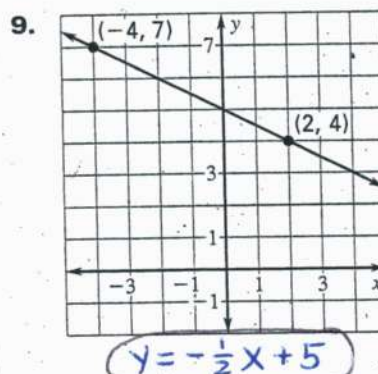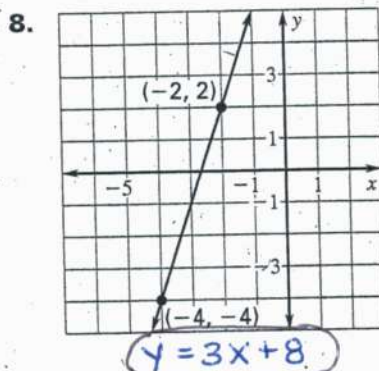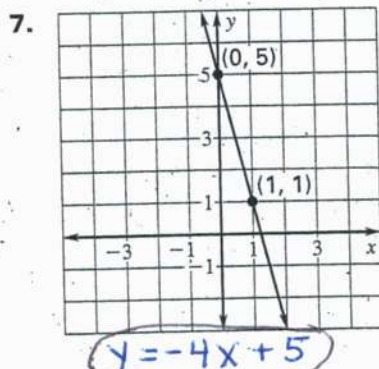
2. $(10, 3)$; $m = -2$   $\boxed{y = -2x + 23}$

3. $(2, -3)$; $m = 7$   $\boxed{y = 7x - 17}$

4. $(-4, -9)$; $m = 2$   $\boxed{y = 2x - 1}$

5. $(5, -4)$; $m = \frac{1}{3}$   $\boxed{y = \frac{1}{3}x - \frac{17}{3}}$

6. $(-8, 1)$; $m = -\frac{3}{4}$   $\boxed{y = -\frac{3}{4}x - 5}$

**Write an equation of the line shown.**

7. $(0, 5)$, $(1, 1)$   $\boxed{y = -4x + 5}$

8. $(-2, 2)$, $(-4, -4)$   $\boxed{y = 3x + 8}$

9. $(-4, 7)$, $(2, 4)$   $\boxed{y = -\frac{1}{2}x + 5}$

**Write an equation of the line that passes through the given points.**

10. $(-10, 7)$, $(5, -3)$   $\boxed{y = -\frac{2}{3}x + \frac{1}{3}}$

11. $(-5, -3)$, $(12, 17.4)$   $\boxed{y = \frac{6}{5}x + 3}$

12. $(-8, 84)$, $(5, -46)$   $\boxed{y = -10x + 4}$

**Write an equation for the linear function f with the given values.**

13. $f(4) = -8$, $f(-3) = 1$   $\boxed{f(x) = \frac{9}{7}x - \frac{20}{7}}$

14. $f(6) = -4$, $f(9) = -9$   $\boxed{f(x) = -\frac{5}{3}x + 6}$

15. $f(-1) = -6$, $f(4) = -14$   $\boxed{f(x) = -\frac{8}{5}x - \frac{38}{5}}$

16. **Oil Changes** You are scheduled to start your job at an oil change shop 2 hours after the shop opens. Two hours after you start, a total of 11 cars have had their oil changed since the shop opened. Three hours later, a total of 14 cars have had their oil changed. At what rate are cars getting their oil changed since you started working? How many cars had their oil changed before you started work?   $\boxed{\text{1 car per hour}}$  $\boxed{\text{9 cars}}$

17. **Motor Vehicle Licenses** The amount of revenue brought in by states from motor vehicle licenses increased at a relatively constant rate of 499.79 million dollars per year from 1990 to 2000. In 2000, the states brought in 15,099 million dollars in revenue from motor vehicle licenses.

   a. What was the approximate revenue (in million dollars) from licenses in 1990?

   b. Write an equation that gives the revenue (in million dollars) as a function of the number of years since 1990.

   c. Find the revenue from licenses in 1999.

18. **Imports** The number of metric tons of fruits, nuts, and vegetables imported into the United States increased at a relatively constant rate of 437.5 thousand metric tons per year from 1990 to 2002. In 2002, about 9900.5 thousand metric tons of fruits, nuts, and vegetables were imported. Write an equation that gives the number of thousand metric tons imported as a function of the number of years since 1990. Find the year in which the number of metric tons reached 8000 thousand metric tons.

   $\boxed{y = 437.5x + 4650.5}$

   ⑥  $\boxed{\text{between } 1997\text{-}1998}$

Name_____

# Writing Linear Equations in Slope-Intercept Form

Item_____

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

1) Slope $= \dfrac{2}{3}$,  y-intercept $= -1$

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

2) Slope $= -\dfrac{2}{3}$,  y-intercept $= 0$

$$y = -\frac{2}{3}X + 0$$

3) Slope $= -\dfrac{7}{5}$,  y-intercept $= -3$
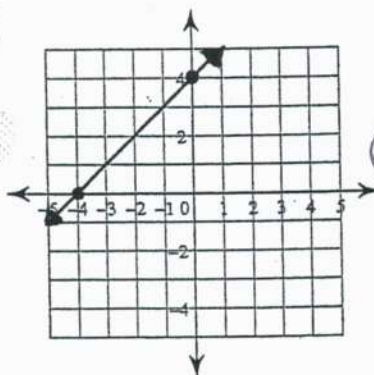
$$y = -\frac{7}{5}X - 3$$

4) Slope $= 4$,  y-intercept $= 3$

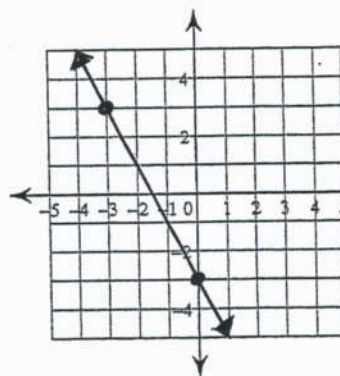$$y = 4X + 3$$

Write the slope-intercept form of the equation of each line.
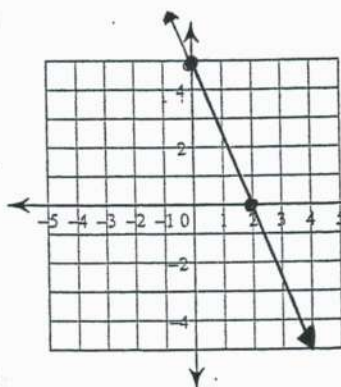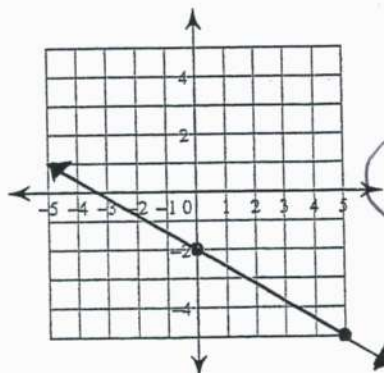
5)



$$y = X + 4$$

6)



$$y = -2X - 3$$

7)



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

8)



$$y = \frac{-3}{5}X - 2$$

⑦

Write the slope-intercept form of the equation of the line through the given point with the given slope.

9) through: $(-4, 5)$, slope $=$ undefined

$$x = -4$$

10) through: $(-2, 5)$, slope $= -2$

$$y = -2x + 1$$

11) through: $(3, -2)$, slope $= -\dfrac{4}{3}$

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

12) through: $(-5, 1)$, slope $= \dfrac{1}{5}$

$$y = \dfrac{1}{5}x + 2$$

13) through: $(-3, 0)$, slope $= 1$

$$y = x + 3$$

14) through: $(4, -4)$, slope $= -\dfrac{7}{4}$

$$y = -\dfrac{7}{4}x + 3$$

Write the slope-intercept form of the equation of the line through the given points.

5) through: $(0, 4)$ and $(2, -3)$

$$y = -\dfrac{7}{2}x + 4$$

16) through: $(-1, 5)$ and $(0, 4)$

$$y = -x + 4$$

17) through: $(0, 3)$ and $(-5, 2)$

$$y = \dfrac{1}{5}x + 3$$

18) through: $(0, 5)$ and $(4, -3)$

$$y = -2x + 5$$

19) through: $(-3, 1)$ and $(0, 5)$

$$y = \dfrac{4}{3}x + 5$$

20) through: $(-3, 1)$ and $(-3, -2)$

$$x = -3$$

21) through: $(-2, 0)$ and $(0, -4)$

$$y = -2x - 4$$

22) through: $(-5, -4)$ and $(0, -3)$

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

⑧

1. A recording studio charges musicians an initial fee of $50 to record an album. Studio time costs an additional $35 per hour.

    a. Write an equation that gives the total cost of an album as a function of time.

$$Y = 35X + 50$$

    b. Find the total cost of recording an album that takes 10 hours of studio time.

$$\$400$$

2. A dance academy charges $20 to use a facility and $25 per hour of instruction.

    a. Write an equation that gives the total cost to learn dance as a function of instruction time.

$$Y = 25X + 20$$

    b. Find the total cost of 2 hours of dance instruction.

$$\$70$$

3. Your gym membership costs $33 per month after an initial membership fee. You paid a total of $228 after six months.

    a. Write an equation that gives the total cost as a function of the length of your gym membership.

$$Y = 33X + 30$$

    b. Find the total cost after 9 months.

$$\$327$$

4. A gym charges $35 per month after an initial membership fee. A member has paid a total of $250 after 6 months.

    a. Write an equation that gives the total cost as a function of the length of your gym membership.

$$Y = 35X + 40$$

    b. Find the total cost after 10 months.

$$\$390$$

5. In BMX racing, racers purchase a one year membership to a track. They also pay an entry fee for each race at that track. One racer paid a total of $125 for 5 faces. A second racer paid a total of $170 for 8 races. How much does the track membership cost? What is the entry fee per race?

membership=$50
entry fee = $15

6. A BMX race track charges a membership fee and an entry fee per race. One racer paid a total of $76 for 3 races. Another racer paid a total of $124 for 7 races. How much does the track membership cost? What is the entry fee per race?

membership= $40
entry fee =$12

7. You wake up at 8:00 in the morning to find that it is snowing outside, so you go back to sleep. (SNOW DAY!!!) When you wake up 2 hours later, there are 5 inches of snow on the ground. At 2:00pm, there are 11 inches of snow on the ground. At what rate is the snow falling? How much snow was already on the ground when you first woke up at 8am?

snow on ground at
8:00am = 2 inches

rate = 1.5" per hour

**LESSON 5.4** **Practice B**

*For use with pages 311–316*

**Write two equations in standard form that are equivalent to the given equation.**

1. $6x + 24y = 18$

2. $8x - 14y = 2$

3. $6x + y = 1$

4. $-4x - 2y = 16$

5. $2x + 3y = 11$

6. $-9x + 4y = 5$

**Write an equation in standard form of the line that passes through the given point and has the given slope *m*.**

7. $(4, 3), m = 7$ $\;7x - y = 25$

8. $(5, -1), m = 2$ $\;2x - y = 11$

9. $(-2, 6), m = 1$ $\;x - y = -8$

10. $(-7, 8), m = -3$ $\;3x + y = -13$

11. $(9, -10), m = -4$ $\;4x + y = 26$

12. $(-15, -4), m = \frac{1}{2}$ $\;x - 2y = -7$

**Write an equation in standard form of the line that passes through the given points.**

13. $(2, 6), (3, 8)$ $\;2x - y = -2$

14. $(-1, 2), (5, 4)$ $\;x - 3y = -7$

15. $(7, -3), (4, 1)$ $\;4x + 3y = 19$

16. $(3, -8), (5, -9)$ $\;x + 2y = -13$

17. $(-5, 6), (2, -3)$ $\;9x + 7y = -3$

18. $(-3, -1), (6, -8)$ $\;7x + 9y = -30$

**Write equations of the horizontal and the vertical lines that pass through the given point.**
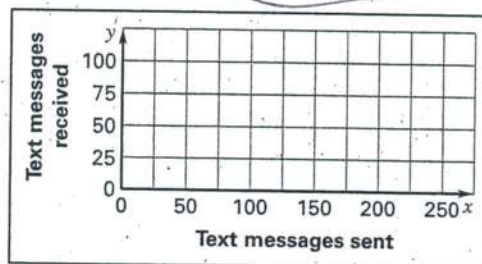
19. $(8, 3)$ $\;x = 8$, $y = 3$

20. $(-2, 6)$ $\;x = -2$, $y = 6$

21. $(5, -5)$ $\;x = 5$, $y = -5$

22. **Text Messaging** Your cell phone plan charges you $.02 to send a text message and $.07 to receive a text message. You plan to spend no more than $5 a month on text messaging.

   a. Write an equation in standard form that models the possible combinations of sent text messages and received text messages.

   b. Graph the equation from part (a). *Explain* what the intercepts of the graph mean in this situation.

   c. List three other possible combinations of the number of messages you can send and receive.

*Graph axes: Text messages received (y-axis, 0 to 100 in increments of 25); Text messages sent (x-axis, 0 to 250 in increments of 50)*

23. **Potting Soil Mix** You are making 24 pounds of your own potting soil mix of sphagnum peat moss and coarse sand. You buy the peat moss in bags that weigh approximately 2 pounds.

   a. The last time you made 24 pounds of potting soil, you used 9 bags of sphagnum peat moss and 4 bags of coarse sand. Use this information to find the number of pounds in a bag of coarse sand.

   b. Write an equation in standard form that models the possible combinations of bags of sphagnum peat moss and coarse sand you can use.

   c. List three possible combinations of whole bags of sphagnum peat moss and coarse sand you can use to make the potting soil.

# Writing Linear Equations in Standard Form

**Write the standard form of the equation of each line given the slope and y-intercept.**

1) Slope $= \dfrac{5}{2}$, y-intercept $= 3$

$$5X - 2y = -6$$

2) Slope $= -\dfrac{6}{5}$, y-intercept $= 5$

$$6X + 5y = 25$$
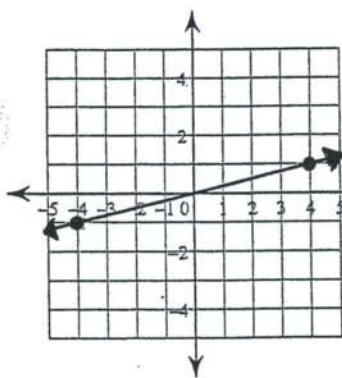
3) Slope $= 4$, y-intercept $= -4$

$$4X - y = 4$$

4) Slope $= -\dfrac{3}{4}$, y-intercept $= -3$

$$3X + 4y = -12$$

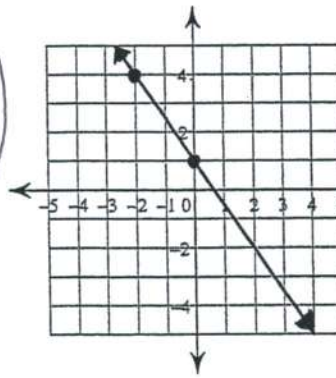**Write the point slope form of the equation of each line.**

5)



$$y + 1 = \tfrac{1}{4}(X + 4)$$
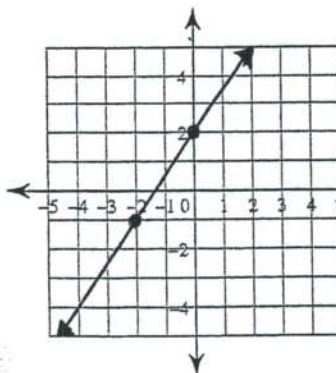$$y - 1 = \tfrac{1}{4}(X - 4)$$

6)



$$y - 4 = -\tfrac{3}{2}(X + 2)$$
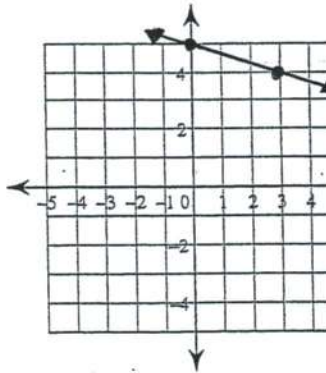$$y - 1 = -\tfrac{3}{2}(X - 0)$$

7)



$$y + 1 = \tfrac{3}{2}(X + 2)$$
$$y - 2 = \tfrac{3}{2}(X - 0)$$

8)



$$y - 5 = -\tfrac{1}{3}(X - 0)$$
$$y - 4 = -\tfrac{1}{3}(X - 3)$$

(12)

Write the standard form of the equation of the line through the given point with the given slope.

9) through: $(-1, -1)$, slope $= 5$

$$5x - y = -4$$

10) through: $(-4, -5)$, slope $= \dfrac{5}{2}$

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

11) through: $(2, -1)$, slope $=$ undefined

$$x = 2$$

12) through: $(4, 2)$, slope $= -\dfrac{3}{4}$

$$3x - 4y = 4$$

13) through: $(1, 5)$, slope $= -8$

$$8x + y = 13$$

14) through: $(1, -2)$, slope $= -\dfrac{3}{4}$

$$3x + 4y = -5$$

Write the standard form of the equation of the line through the given points.

15) through: $(-3, -3)$ and $(1, 3)$

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

16) through: $(0, -4)$ and $(1, -2)$

$$2x - y = 4$$

17) through: $(1, -1)$ and $(4, -2)$

$$x + 3y = -2$$

18) through: $(-3, -1)$ and $(0, 5)$

$$2x - y = -5$$

19) through: $(3, 0)$ and $(1, 1)$

$$x + 2y = 3$$

20) through: $(-1, 1)$ and $(0, -2)$

$$3x + y = -2$$

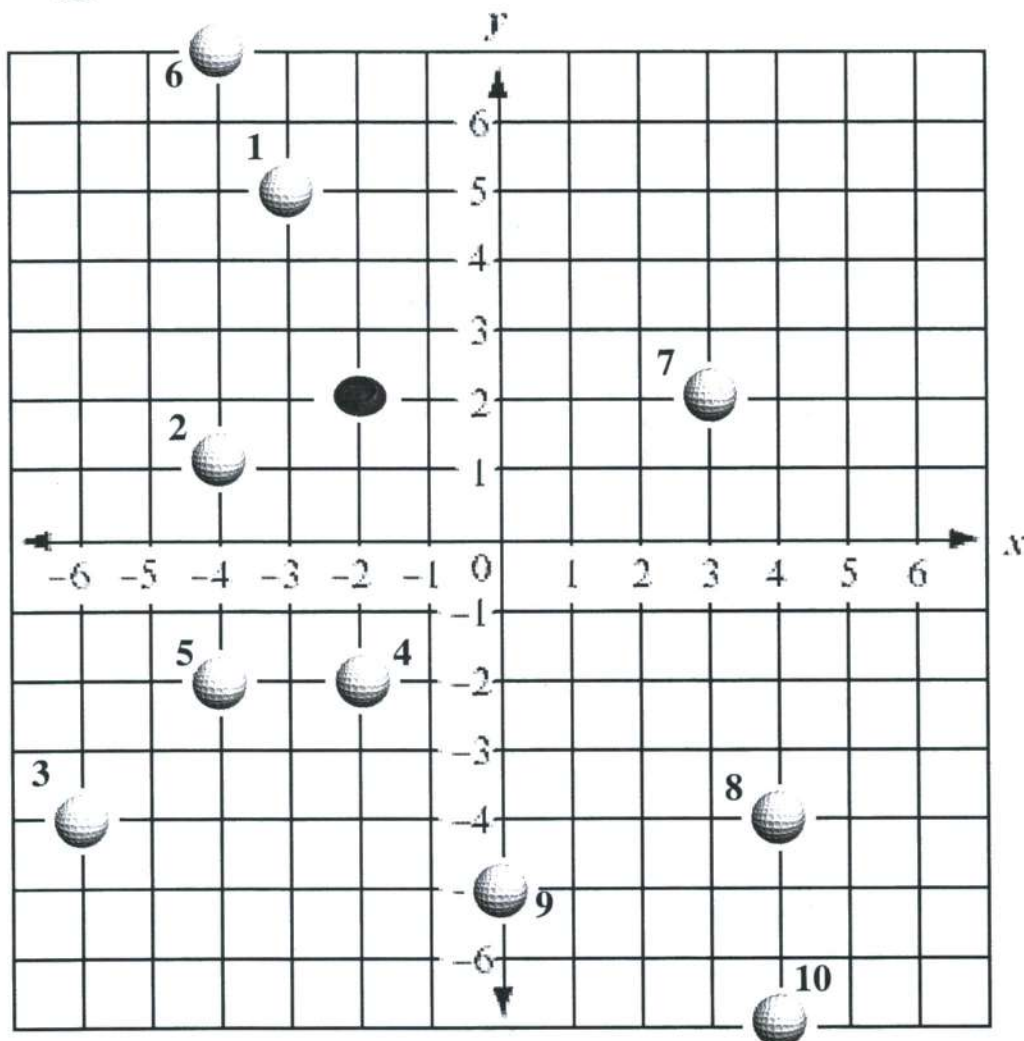21) through: $(-4, 2)$ and $(0, -5)$

$$7x + 4y = -20$$

22) through: $(0, 2)$ and $(-5, 0)$

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

⑬

# Linear Equations GOLF

The golf cup is located at the point (-2, 2). Find the equation that will
knock each ball into the tee.

| Golf ball | Shot | Golf ball | Shot |
|-----------|------|-----------|------|
| 1 | $3x + y = -4$ | 6 | $5x + 2y = -6$ |
| 2 | $x - 2y = -6$ | 7 | $y = 2$ |
| 3 | $3x - 2y = -10$ | 8 | $x + y = 0$ |
| 4 | $x = -2$ | 9 | $7x + 2y = -10$ |
| 5 | $2x - y = -6$ | 10 | $3x + 2y = -2$ |

Sections 5.1-5.4 Review                                  Name: _____

1.  Write the formulas discussed in class thus far:

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

Point-Slope Form: _____ $y - y_1 = m(x - x_1)$ _____

Standard Form: _____ $Ax + By = C$ _____

Slope-Intercept Form: _____ $y = mx + b$ _____

2.  Consider $y - 3 = -2(x + 5)$

    a.   This is in ___point-slope___ form.

    b.   The slope of this line is ___$-2$___

    c.   The point on this line is ___$(-5, 3)$___

3.  Consider $y = 4x - 7$

    a.   This is in ___slope-intercept___ form.

    b.   The slope of this line is ___$4$___

    c.   The y-intercept of this line is ___$-7$___

4.  Consider $5x - 4y = 12$

    a.   This is in ___standard___ form

    b.   $A = \underline{5}$      $B = \underline{-4}$      $C = \underline{12}$

    c.   The x-intercept of this line is ___$12/5$___

    d.   The y-intercept of this line is ___$-3$___

5. Given the points (-3,6) and (5,-1),

    a. Find the slope of this line.

$$m = -\frac{7}{8}$$

    b. Write an equation in point-slope form.

$$y - 6 = -\frac{7}{8}(x + 3)$$
$$y + 1 = -\frac{7}{8}(x - 5)$$

    c. Write this equation in standard form.

$$7x + 8y = 27$$

    d. Find the x-intercept and the y-intercept.

$$x : \frac{27}{7} \qquad y : \frac{27}{8}$$

    e. Using your slope(from part a) and your y-intercept (from part d), rewrite this in slope-intercept form.

$$y = -\frac{7}{8}x + \frac{27}{8}$$

6. Given (6,-5) and an <u>undefined</u> slope, write an equation for this line.

$$x = 6$$

7. Given (-3,-7) and <u>m=0</u>, write an equation for this line.

$$y = -7$$

8. Given (-2,1) and (0,4), write an equation in slope-intercept form.

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

<u>Objective:</u> Write linear equations using a variety of methods

linear equation is an equation whose graph is a line. Whether writing or graphing linear equations two important ideas to understand are slope and intercepts.

## <u>Slope</u>
The slope of a non-vertical line is the ratio of the vertical change (the rise) to the horizontal change (the run) between any two points on the line. The slope of a line is represented by the letter $m$.

Slope can be found using:

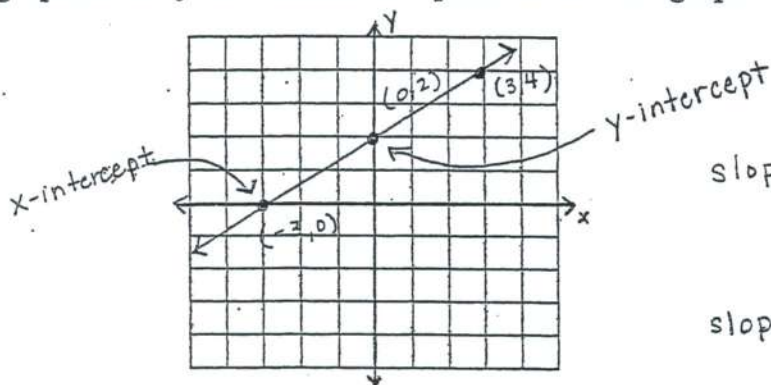$$m = \frac{rise}{run} \qquad m = \frac{(y_2 - y_1)}{(x_2 - x_1)} \qquad m = \frac{\Delta y}{\Delta x}$$

given points $(x_1, y_1)$ and $(x_2, y_2)$

## <u>Intercepts</u>
The x-intercept of a graph is the x-coordinate of a point where the graph crosses the x-axis.
The y-intercept of a graph is the y-coordinate of a point where the graph crosses the y-axis.



$$slope = \frac{rise}{run} = \frac{2}{3}$$

OR

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

## <u>Forms of Linear Equations</u>
There are three forms we use when writing a linear equation: Point-Slope Form, Slope-Intercept Form, and Standard Form.

**Point-Slope Form:** $(y - y_1) = m(x - x_1)$ where $m$ represents slope and $(x_1, y_1)$ is a point on the line

Ex: The line $(y - 3) = \frac{2}{5}(x + 1)$ has a slope of $\frac{2}{5}$ and goes through the point (-1,3)

**Slope-Intercept Form:** $y = mx + b$ where $m$ represents slope and $b$ represents the y-intercept.

Ex: The line $y = -4x - 6$ has a slope of -4 and a y-intercept of -6.

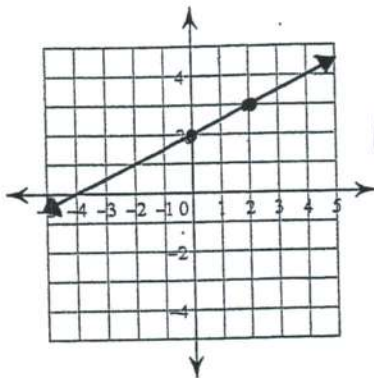**Standard Form:** $Ax + By = C$ where A, B, and C are integers and $A \geq 0$.

Recall: $-\frac{A}{B}$ is the slope, $\frac{C}{A}$ is the x-intercept, and $\frac{C}{B}$ is the y-intercept.

Ex: The line $2x + 3y = -12$ has a slope of $-\frac{2}{3}$, x-intercept of -6 and y-intercept of -4.

(17)

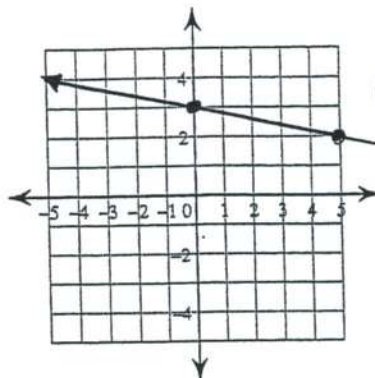# Writing Linear Equations (5.1 - 5.4) Review

**Write the slope-intercept form of the equation of each line.**
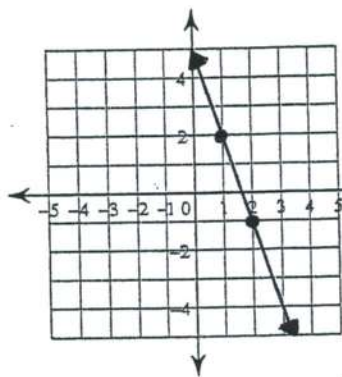
1)

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

2)

$y = -\frac{1}{5}X + 3$

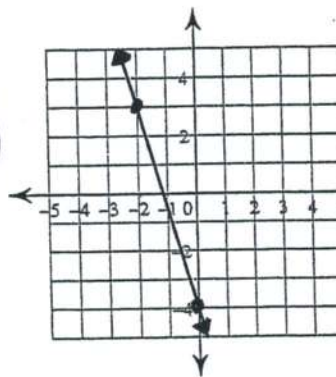**Write the point-slope form of the equation of each line.**
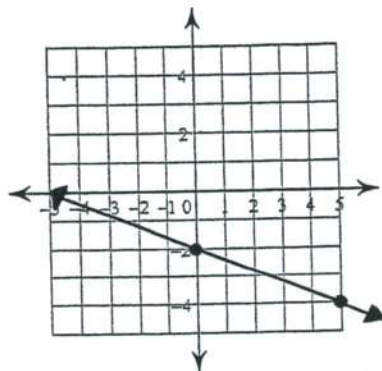
3)

$y - 2 = -3(X-1)$
$y + 1 = -3(X-2)$

4)

$Y - 3 = -\frac{7}{2}(X+2)$
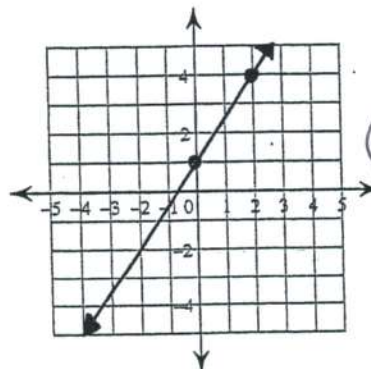$y + 4 = -\frac{7}{2}(X-0)$

**Write the standard form of the equation of each line.**

5)

$2X + 5y = -10$

6)

$3X - 2y = -2$

**Write the slope-intercept form of the equation of each line given the slope and y-intercept.**

7) Slope $= -2$, y-intercept $= -1$

$y = -2x - 1$

8) Slope $= \frac{3}{2}$, y-intercept $= -2$

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

(18)

te the point-slope form of the equation of each line given the slope and y-intercept.

:lope $= -2$, y-intercept $= 3$

$y - 3 = -2(x - 0)$

10) Slope $= -\frac{4}{3}$, y-intercept $= 1$

$y - 1 = -\frac{4}{3}(x - 0)$

te the standard form of the equation of each line given the slope and y-intercept.

Slope $= -1$, y-intercept $= -4$   $x + y = -4$

12) Slope $= 8$, y-intercept $= 4$   $8x - y = -4$

ite the slope-intercept form of the equation of the line through the given point with the given slope.

through: $(1, -4)$, slope $=$ undefined

$x = 1$

14) through: $(4, 3)$, slope $= \frac{5}{4}$   $y = \frac{5}{4}x - 2$

ite the point-slope form of the equation of the line through the given point with the given slope.

through: $(-3, 5)$, slope $= -2$

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

16) through: $(5, 2)$, slope $= \frac{3}{5}$   $y - 2 = \frac{3}{5}(x - 5)$

ite the standard form of the equation of the line through the given point with the given slope.

through: $(-2, 4)$, slope $= -2$   $2x + y = 0$

18) through: $(2, -2)$, slope $= -1$   $x + y = 0$

ite the slope-intercept form of the equation of the line through the given points.

through: $(1, 2)$ and $(-1, -4)$   $y = 3x - 1$

20) through: $(-3, 2)$ and $(0, 4)$   $y = \frac{2}{3}x + 4$

rite the point-slope form of the equation of the line through the given points.

through: $(0, 4)$ and $(-1, -3)$   $y - 4 = 7(x - 0)$
$y + 3 = 7(x + 1)$

22) through: $(4, 3)$ and $(0, 0)$   $y - 0 = \frac{3}{4}(x - 0)$
$y - 3 = \frac{3}{4}(x - 4)$

rite the standard form of the equation of the line through the given points.

through: $(-1, 5)$ and $(-4, 4)$   $x - 3y = -16$

24) through: $(-1, 2)$ and $(3, 5)$   $3x - 4y = -11$

rite the standard form of the equation of each line.

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

26) $y = -\frac{1}{3}x - 3$   $x + 3y = -9$

') $y - 4 = -2(x + 2)$   $2x + y = 0$

28) $y + 1 = \frac{1}{2}(x - 4)$   $x - 2y = 6$

rite the slope-intercept form of the equation of each line.

$y - 5 = -4(x + 2)$   $y = -4x - 3$

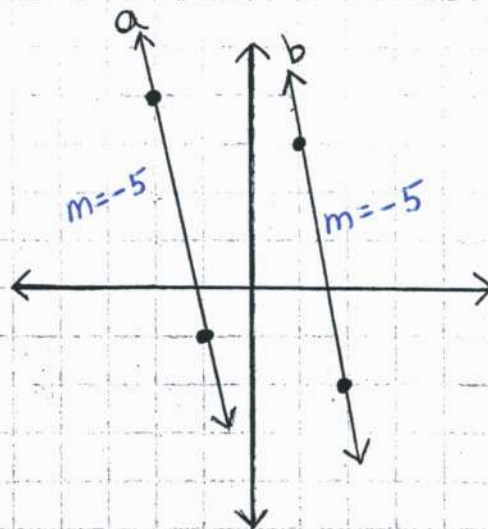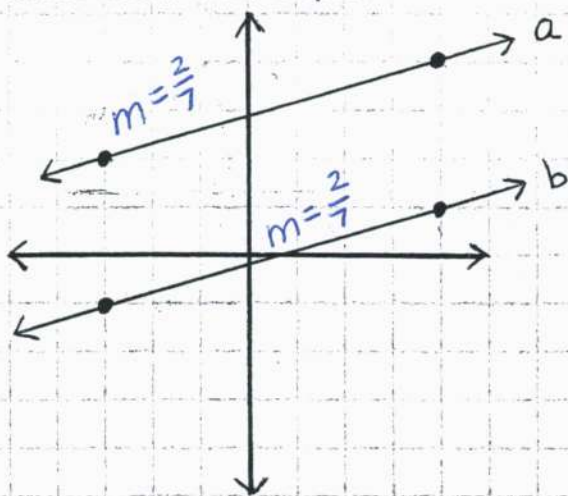30) $y - 1 = \frac{3}{5}(x - 5)$   $y = \frac{3}{5}x - 2$

1) $0 = 6y + 4x$   $y = -\frac{2}{3}x$

32) $3x + 3y = -3$   $y = -x - 1$

(19)

## Section 5.5: Parallel and Perpendicular Lines in a Coordinate Plane

In each diagram below, line *a* is parallel to line *b*. Find the slope of each line. What do you notice about their slopes?

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

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

$a$  $m=-5$  $b$  $m=-5$

### Slopes of Parallel Lines:
If two non-vertical lines in the same plane are parallel, then their slopes are
_____ the same _____.

In each diagram below, line *a* is perpendicular to line *b*. Find the slope of each line. What do you notice about their slopes?

$a$  $m=\frac{3}{2}$

$b$

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

$b$  $m=2$

$a$

$m=-\frac{1}{2}$
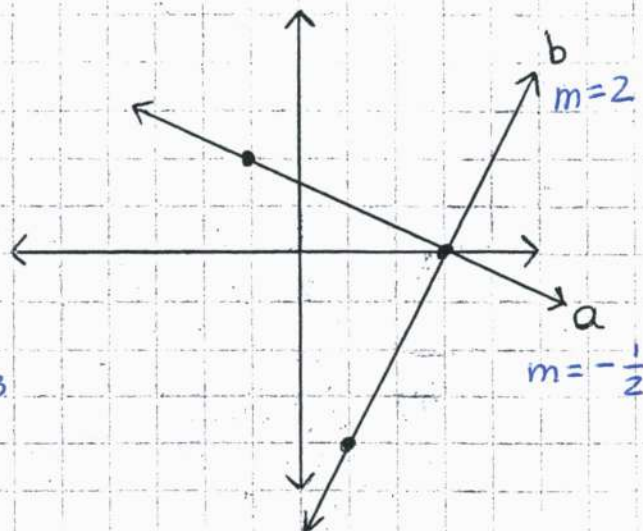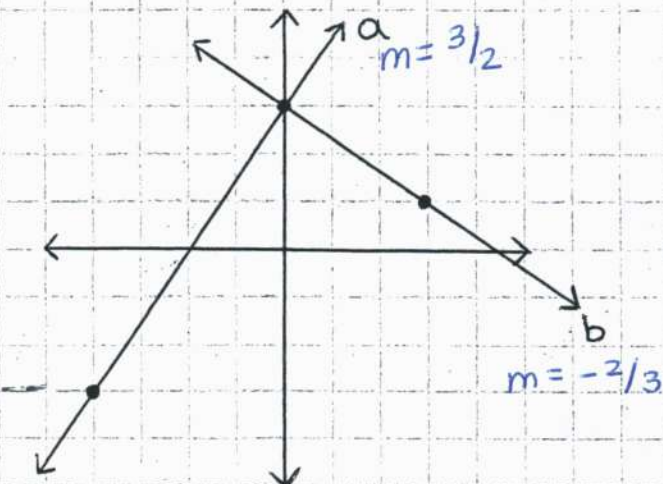
### Slopes of Perpendicular Lines:
If two non-vertical lines in the same plane are perpendicular, then their slopes are
_____ opposite reciprocals _____.

Example 1: Determine which lines, if any, are parallel or perpendicular.

Line a: -x + 3y = 1.        Line b: y = -3x + 1        Line c: 2x – 6y = 4

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

$$parallel : a \ \& \ c$$
$$perpendicular : \begin{matrix} a \ \& \ b \\ b \ \& \ c \end{matrix}$$

Example 2: Write an equation in Slope-Intercept Form of the line that passes through (-2, 4) and is parallel to the line y = - 3x + 4.

$$y = -3X - 2$$

Example 3: Write an equation in Slope-Intercept Form that passes through (4, -2) and is perpendicular to the line y = 4x + 2.

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