Name:_____Date:_____Per:_____

Chapter 5 Practice
Writing Linear Equations

Read each problem carefully and be sure to show ALL of your work. Make sure all numbers are written clearly and to circle each answer. Do your best!
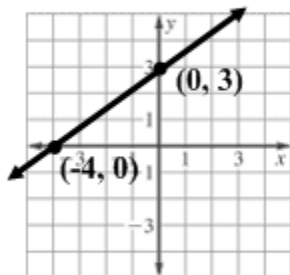
Write the equation of the line with the given information in slope-intercept form:

1. Slope $= -3$; y-intercept: $-\frac{1}{2}$

$\qquad y = mx + b$
$\qquad y = -3x + -\frac{1}{2}$ (All you have to do is plug in m and b)
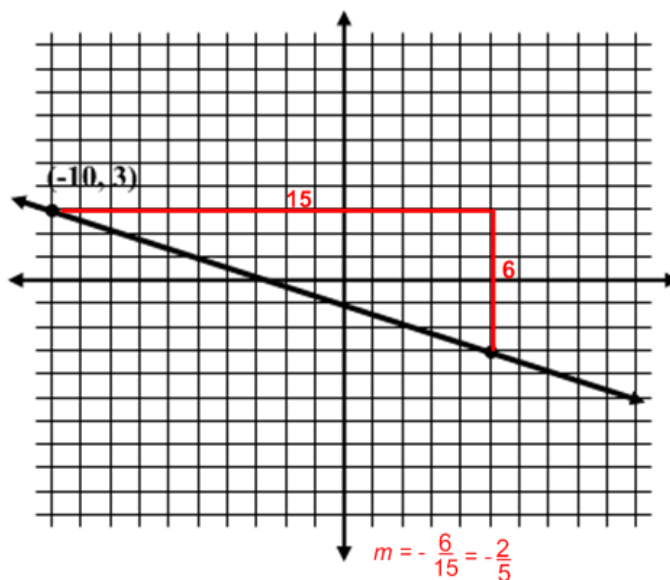
2.

$\qquad y = mx + b$
$\qquad y = \frac{3}{4}x + 3$

*find slope using either rise/over or y_2-y_1 formula
*can see where the line hits the y-axis for sure

3.

$m = -\frac{6}{15} = -\frac{2}{5}$

$\qquad y = mx + b$
$\qquad 3 = -\frac{2}{5}(-10) + b$
$\qquad 3 = 4 + b$
$\qquad -1 = b$
$\qquad y = -\frac{2}{5}x - 1$

4. passes through $(-5, 4)$; $m = \dfrac{3}{4}$

$\qquad y = mx + b$
$\qquad 4 = \frac{3}{4}(-5) + b$
$\qquad 4 = -\frac{15}{4} + b$
$\qquad +\frac{15}{4} \quad +\frac{15}{4}$
$\qquad \rule{3cm}{0.4pt}$
$\qquad \frac{31}{4} = b$

$y = \frac{3}{4}x + \frac{31}{4}$

*b could also be written as $7\frac{3}{4}$

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

5. (8, 9) (–4, 6)   **6.** (2, 3.5) (0, 3.5)

*Find slope using $\frac{y_2-y_1}{x_2-x_1}$

$m = \frac{6-9}{-4-8} = \frac{-3}{-12} = \frac{1}{4}$ $m = \frac{3.5-3.5}{0-2} = \frac{0}{-2} = 0$

$y = mx + b$ $y = mx + b$

$9 = \frac{1}{4}(8) + b$ $y = 0x + 3.5$ *Remember that b

$9 = 2 + b$ occurs when $x = 0$

$7 = b$ $y = 3.5$ *0 times x equals 0

$y = \frac{1}{4}x + 7$

7. $f(1) = 1$; $f(–2) = –17$

(1, 1) and (−2, −17)

$m = \frac{-17-1}{-2-1} = \frac{-18}{-3} = 6$

$1 = 6(1) + b$
$1 = 6 + b$
$-5 = b$
$y = 6x - 5$

8. a. Give the slope of the line parallel to $2y + 4x = 8$.

   Parallel lines have the same slope, so if you know the slope of $2y + 4x = 8$, then the slope of ANY line parallel to it will be the same.

To find the slope of $2y + 4x = 8$, you need to first put it in slope-intercept form. You cannot identify the slope if you don't do this:

$2y + 4x = 8$
$\underline{-4x \quad -4x}$
$\frac{2y}{2} = \frac{8 - 4x}{2}$
$y = 4 - 2x$ The slope of this line is −2, so the slope of ANY line parallel to it would also be −2.

b. Give the slope of the line perpendicular to $y + 4x = 9$.

Perpendicular lines have slopes that are opposite reciprocals, so if you know the slope of $y + 4x = 9$, then the slope of ANY line perpendicular to it will be the opposite reciprocal of its slope.

To find the slope of $y + 4x = 9$, you need to first put it in slope-intercept form. You cannot identify the slope if you don't do this:

$y + 4x = 9$
$\underline{-4x \quad -4x}$
$\quad y = 9 - 4x$

$\qquad y = 9 - 4x \qquad$ The slope of this line is -4, so the slope of ANY line perpendicular to it would be ¼

Write the equation of the line in slope – intercept form that passes through the given point and is parallel to the given line.

9. $3y + 9x = 2; \ (1, 2)$

Since parallel lines have the same slope, first identify the slope of the given line by putting it into slope-intercept form:

$\dfrac{3y}{3} = \dfrac{2 - 9x}{3}$

$y = \dfrac{2}{3} - 3x \qquad$ The slope of this line is -3, so the slope of the other line is also -3. This new line also passes through the point (1, 2) so we can now plug in all information to find the missing b.

$$y = mx + b$$
$$2 = -3(1) + b$$
$$2 = -3 + b$$
$$5 = b$$

$$y = -3x + 5$$

Write the equation of the line in slope – intercept from that passes through the given point and is perpendicular to the given line.

10. $y = 2x + 3;\ (4, 3)$

Since perpendicular lines have the slopes that are opposite reciprocals, first identify the slope of the given line: The slope of this line is 2, so the slope of the other line is also $-\frac{1}{2}$. This new line also passes through the point (4, 3) so we can now plug in all information to find the missing b.

$y = mx + b$
$3 = -\frac{1}{2}(4) + b$
$3 = -2 + b$
$5 = b$

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

11. Decide which lines, if any, are parallel or perpendicular. Show or explain work.

a. $y = \frac{2}{7}x + 1$
b. $7y = -2x - 2$
c. $7x - 2y = -4$

Put all lines in slope-intercept form so you can easily identify the slopes.

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

$y = -\frac{2}{7}x - \frac{2}{7}$
$m = -\frac{2}{7}$

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

*No slopes are exactly the same so no lines are paralle, but lines b and c's slopes are opposite reciprocals so they are perpendicular.

So $b \perp c$

12. Write the equation of the in standard form if the line passes through the point (4, –4) and has a slope of $-\frac{3}{4}$.

$y = mx + b$
$-4 = -\frac{3}{4}(4) + b$
$-4 = -3 + b$
$-1 = b$

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

$3x + 4y = -4$ *Don't forget that there cannot be fractions or decimals

13. Find the missing coefficient and write the equation in standard form using the given information:

The line $2x + By = -2$ passes through the point $(1, -4)$

Plug in what you know. Find B then plug back into original.

$$2(1) + B(-4) = -2$$
$$2 + -4B = -2$$
$$-4B = -4$$
$$B = 1 \qquad\qquad 2x + y = -2$$

For numbers 14-16 use the information below.

A cell phone company charges a basic monthly fee, plus a fee for each additional minute used. In one month, one customer paid $42.50 and used 20 extra minutes. Another customer paid $44 for 30 extra minutes.

14. Find the cost per extra minute.
Let x = # of extra minutes, Let y = total cost
   *Create two ordered pairs with the given information:
   $(20, 42.50)$ and $(30, 44)$

Use these ordered pairs to find the slope, then simplify so its cost per 1 minute. $0.15 per minute.

15. Find the basic monthly cost.
Since this is the cost for 0 extra minutes, then it is really the y-intercept.
   $y = mx + b$
   $44 = 0.15(30) + b$
   $44 = 4.5 + b$
   $39.5 = b$

16. Write an equation to represent the total cost for one month for any number of additional minutes used.

   $y = 0.15x + 39.5$