

Name: _____

HN Algebra 2

Summer HW

This packet will be worth 10 points graded for completion. We will review this material and have a graded exam within the first few days of school. Please email me with any questions at jacksonk@slshs.org.

2-1 Solving Linear Equations and Inequalities

EXAMPLES

Solve.

$$\blacksquare 5(x + 4) = 3x - 2$$

$$5x + 20 = 3x - 2 \quad \text{Use the Distributive Property.}$$

$$2x + 20 = -2 \quad \text{Subtract } 3x \text{ from both sides.}$$

$$2x = -22 \quad \text{Subtract 20 from both sides.}$$

$$x = -11 \quad \text{Divide both sides by 2.}$$

$$\blacksquare \frac{15 - 3x}{2} < 12$$

$$15 - 3x < 24 \quad \text{Multiply both sides by 2.}$$

$$-3x < 9 \quad \text{Subtract 15 from both sides.}$$

$$x > -3 \quad \text{Divide both sides by } -3x, \text{ and reverse the inequality.}$$

Solve each equation.

1. $-30 = 6(x - 3)$

4. $3x - 8(3 - x) = 53$

2. $5(x - 8) - (x + 6) = 18$

5. $3n - 40 = \frac{1}{2}n + 35$

3. $\frac{1}{3}(2x - 7) = 4$

6. $5(x - 4) - 1 = -7x + 3$

7. $8t + 11 - 6t = 5t + 35$

9. $-4(2n - 5) = -8n - 20$

8. $2x + 4(x + 1) = 6\left(x + \frac{2}{3}\right)$

10. $9(3 - 2x) = -6(3x - 5)$

Solve each inequality.

11. $-3x + 8 \leq 14$

13. $5(x - 2) \geq 4(2x + 6) + 2$

12. $3(x - 1) > 7(x + 3)$

14. $8(x - 1) \leq 4(2 + 2x)$

2-2 Proportional Reasoning

EXAMPLE

Solve the proportion.

$$\blacksquare \frac{x+2}{12} = \frac{15}{20}$$

$$20(x+2) = (12)(15) \quad \text{Set cross products equal.}$$

$$20x + 40 = 180$$

$$20x = 140$$

$$x = 7$$

Solve each proportion.

$$1) \frac{10}{a} = \frac{6}{8}$$

$$2) \frac{7}{9} = \frac{n}{6}$$

$$3) \frac{7}{6} = \frac{2}{k}$$

$$4) \frac{8}{x} = \frac{4}{8}$$

$$5) \frac{6}{x} = \frac{8}{2}$$

$$6) \frac{n-10}{8} = \frac{9}{3}$$

$$7) \frac{m-1}{5} = \frac{8}{2}$$

$$8) \frac{8}{5} = \frac{3}{x-8}$$

$$9) \frac{2}{9} = \frac{10}{p-4}$$

$$10) \frac{9}{n+2} = \frac{3}{9}$$

$$11) \frac{b-10}{7} = \frac{b}{4}$$

$$12) \frac{9}{4} = \frac{r}{r-4}$$

13) $\frac{x}{5} = \frac{x+2}{9}$

14) $\frac{n}{8} = \frac{n-4}{3}$

15) $\frac{3}{10} = \frac{a}{a+2}$

16) $\frac{x+1}{9} = \frac{x+2}{2}$

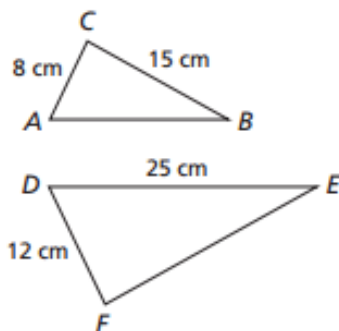
17) $\frac{v-5}{v+6} = \frac{4}{9}$

18) $\frac{n+8}{10} = \frac{n-9}{4}$

19) $\frac{7}{x-1} = \frac{4}{x-6}$

20) $\frac{k+5}{k-6} = \frac{8}{5}$

21. **Geometry** In the diagram shown, $\triangle ABC$ is similar to $\triangle DEF$. Find the lengths of sides \overline{AB} and \overline{EF} .



22. If a flagpole that is 20 feet long casts a 6 foot shadow, how long would the shadow created by a 15 feet tall building be at the same time of day?

2-3 Graphing Linear Functions

EXAMPLES

Find the intercepts. Then graph.

■ $2x - 3y = 12$

$2x = 12$

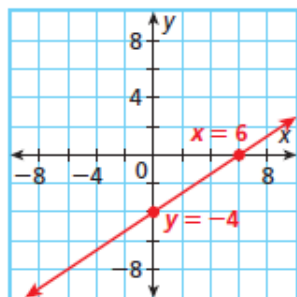
$x = 6$

$-3y = 12$

$y = -4$

Set y equal to 0 to find the x -intercept.

Set x equal to 0 to find the y -intercept.

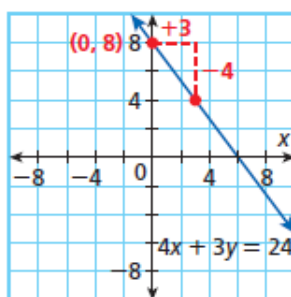


Write each function in slope-intercept form. Then graph.

■ $4x + 3y = 24$

$3y = -4x + 24$ *Isolate the y -term.*

$y = -\frac{4}{3}x + 8$ *Divide both sides by 3.*



Determine whether each data set could represent a linear function.

1.

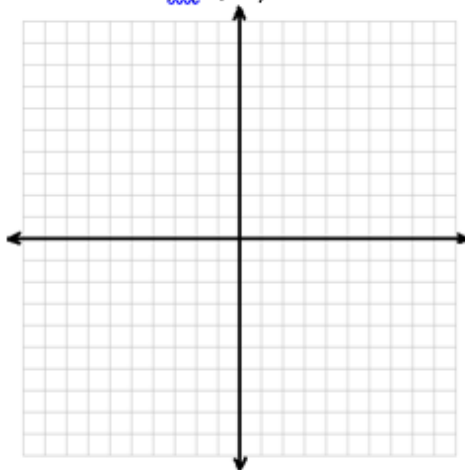
x	3	0	-3	-6
$f(x)$	1	1.5	2	2.5

2.

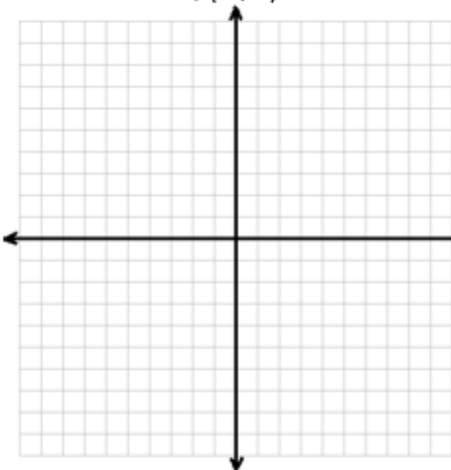
x	2	4	6	8
$f(x)$	5	10	20	40

Graph each line given the slope and a point.

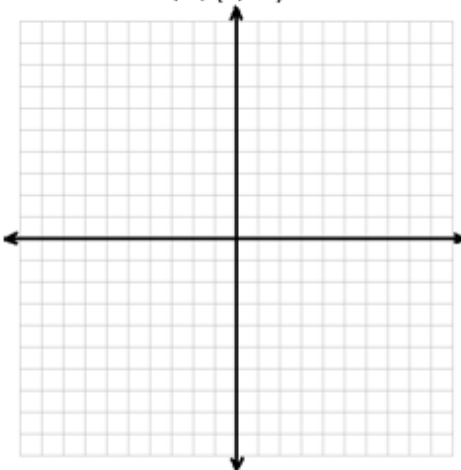
3. $m = 2; (-5, -3)$



4. $m = -1.5; (-2, 6)$



5. $m = -1/3; (3, -4)$

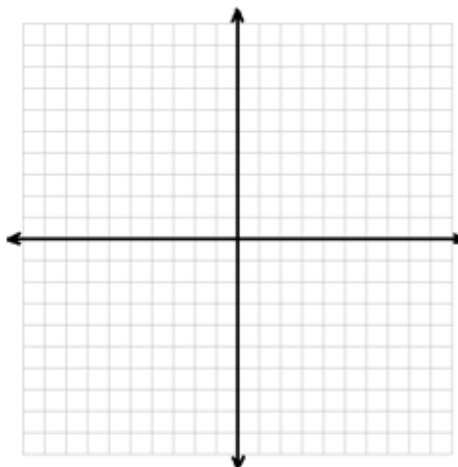


Identify the slope and y-intercept. Then, graph each line.

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

m =

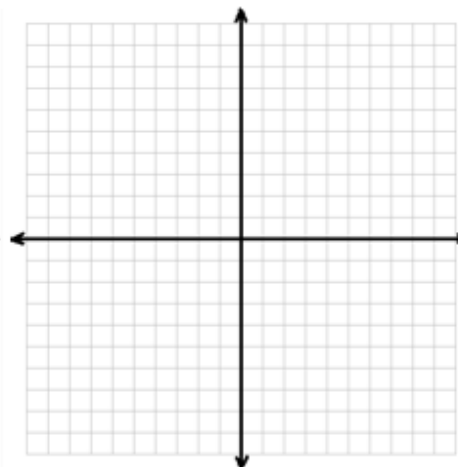
y-int:



7. $y = x - 5$

m =

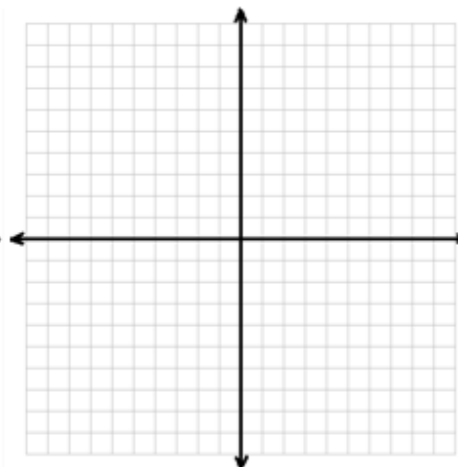
y-int:



8. $y = \frac{-5}{2}x$

m =

y-int:

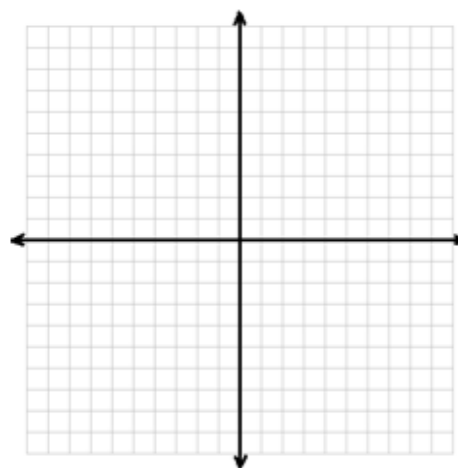


Find the intercepts of each line. Then, graph the line.

9. $x + y = 5$

x-int:

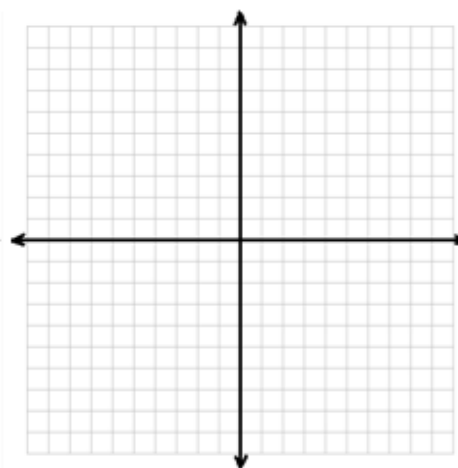
y-int:



10. $3x + 4y = -24$

x-int:

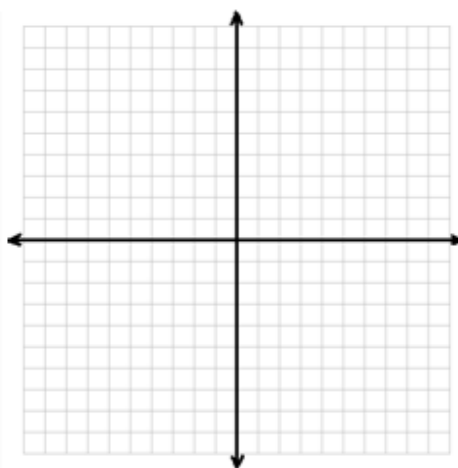
y-int:



11. $-5x + 2y = 10$

x-int:

y-int:

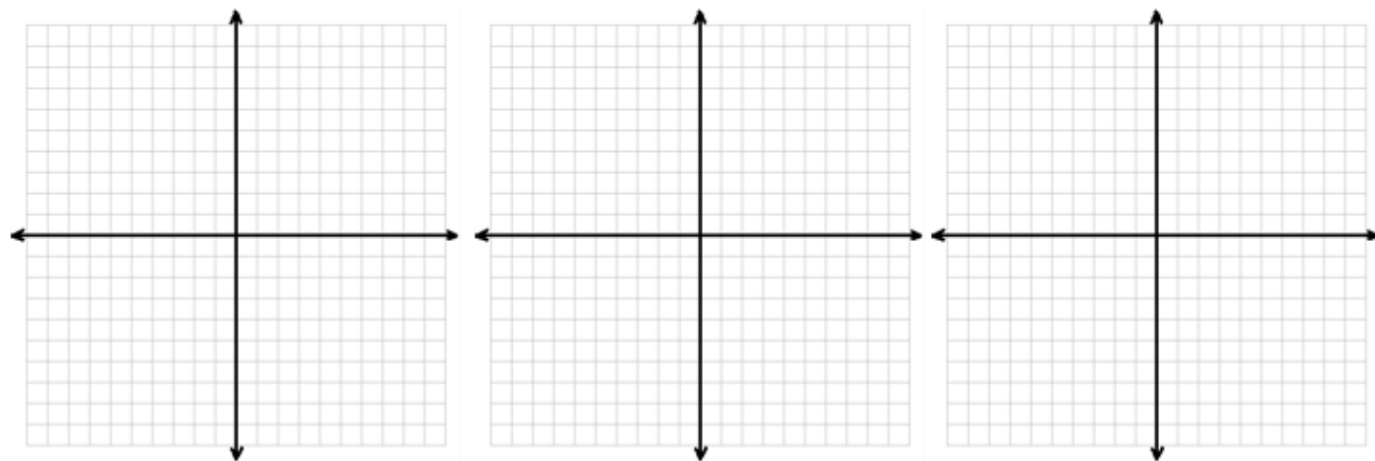


Write each function in slope-intercept form. Then, graph the function.

12. $x + y = 5$

13. $3x + 4y = -24$

14. $-5x + 2y = 10$

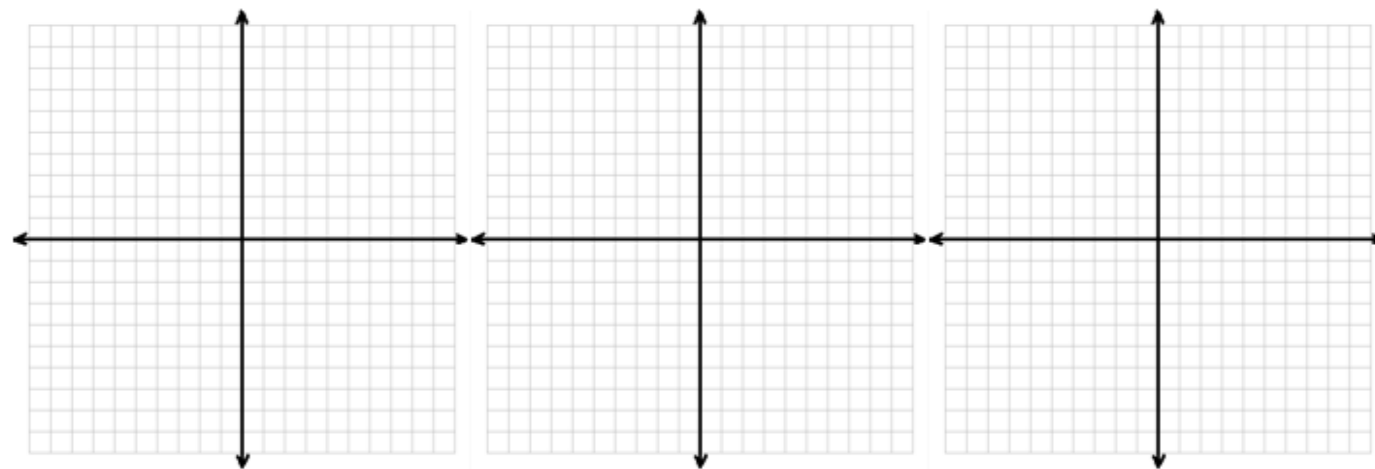


Determine if each line is vertical or horizontal. Then, graph the line.

15. $y = 7$

16. $x = -5$

17. $y = -3.5$



18. A mechanic charges a service fee of \$50 plus an additional \$30 for each hour of work. Write a linear equation to model this situation.
19. School tuition for one child is \$250 plus \$100 for each additional child. Write a linear equation to model this situation.

2-4 Writing Linear Functions

EXAMPLE

- Write the equation of the line through $(3, 4)$ and $(5, 10)$ in slope-intercept form.

Find the slope $m = \frac{10 - 4}{5 - 3} = 3$

Write an equation:

Method 1

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

$$y - 4 = 3(x - 3)$$

$$y - 4 = 3x - 9$$

$$y = 3x - 9 + 4$$

$$y = 3x - 5$$

Method 2

$$y = mx + b$$

$$y = 3x + b$$

$$4 = 3(3) + b$$

$$-5 = b \quad -5 \text{ is the}$$

$$y = 3x - 5 \quad y\text{-intercept}$$

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

Find the slope of each line.

1.

x	2	5	8	11
f(x)	10	8	6	4

2. Line that passes through $(7, -11)$, $(3, 9)$

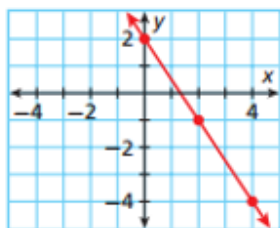
4. A line parallel to $7x - 21y = 15$

3. Line for which $f(5) = 12$ and $f(-9) = 10$

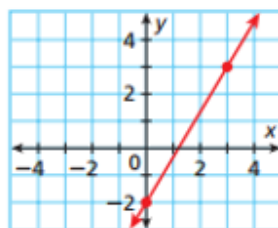
5. A line perpendicular to $7x - 21y = 15$

Write the equation of each line.

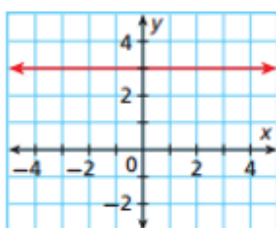
6.



7.



8.



Write the equation of each line.

9. $m = 7$ (0, -5)

12. $f(3) = 10$; $f(1) = 2$

10. $m = \frac{3}{4}$ (-8, 5)

13. Parallel to $5x + 4y = 9$ through (-8, 3)

11. (-1, 6) (-5, 8)

14. Perpendicular to $y = 3x - 8$ through (9, 7)

Find the slope of each line. Determine if each pair of lines is parallel, perpendicular, or neither.

15. $\begin{cases} y = 2x + 7 \\ 2x + 4y = 7 \end{cases}$

16. $\begin{cases} 3x - 9y = 5 \\ 12x - 4y = 11 \end{cases}$

17. $\begin{cases} 20x - 5y = 13 \\ -24x + 6y = 1 \end{cases}$