Advanced Algebra Ch. 2 review

Name KEY

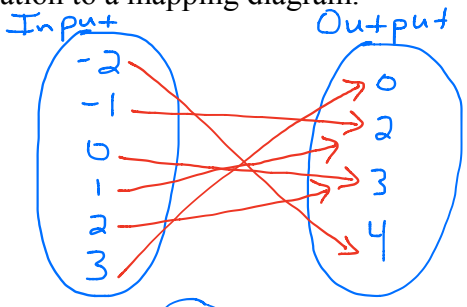
Use these ordered pairs to answer questions 1-3.

(0 , 3), (-1, 2), (2, 3), (-2, 4), (1, 2), (3, 0)

1. List the Domain: $\{0, -1, 2, -2, 1, 3\}$ x-coords

Range: $\{3, 2, 4, 0\}$ y-coords

2. Convert the relation to a mapping diagram.



3. Is the relation a function? (YES) OR NO Explain: Each input has exactly one unique output.

Find the slope of the line that passes through the given points and then write the equation in all 3 forms.

4. (3, -2), (5, 4)

$x_1\ y_1\quad x_2\ y_2$

$m = \frac{\text{Rise}}{\text{Run}} = \frac{\Delta \text{in } y}{\Delta \text{in } x} = \frac{4+(+2)}{5-3} = \frac{6}{2} = 3$

or choose point: (5,4)

$y - 4 = 3(x - 5)$ pt-slope

$y - 4 = 3x - 15$

$+4 \quad +4$

$y = 3x - 11$ slope-intercept

$-3x \quad -3x$

$-3x + y = -11$ standard

point: (3, -2)

$x \quad y$

Point-Slope: $y + 2 = 3(x - 3)$

$y + 2 = 3x - 9$

$-2 \quad -2$

Slope-Intercept: $y = 3x - 11$

$-3x \quad -3x$

Standard: $-3x + y = -11$ or $3x - y = 11$

5. Find the equation of the line that is (parallel/perpendicular) to the line $y = \frac{1}{4}x - 2$ and goes through the point (8, -5)

$y = mx + b$ ✓slope

PARALLEL

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

(8, -5) point

Equation: $y + 5 = \frac{1}{4}(x - 8)$ pt-slope form

you can stop here ↗ or ...

$y + 5 = \frac{1}{4}x - 2$

$-5 \quad -5$

$y = \frac{1}{4}x - 7$ slope-intercept form

PERPINDICULAR

opposite reciprocal slope $m = -4$ slope

(8, -5) point

Equation: $y + 5 = -4(x - 8)$ pt-slope form

you can stop here ↗ or ...

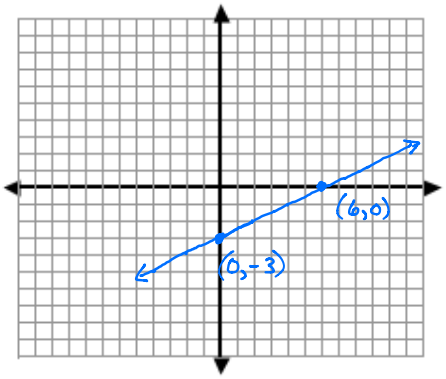
$y + 5 = -4x + 32$

$-5 \quad -5$

$y = -4x + 27$ slope-intercept form

Graph the given the equation/inequality.

6. $3x - 6y = 18$



x-intercept
(6, 0)
$3x - 6(0) = 18$
$3x = 18$
$x = 6$

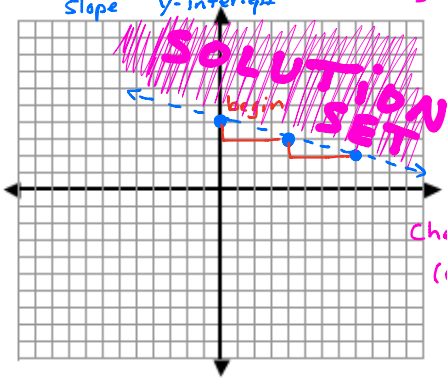
y-intercept
(0, -3)
$3(0) - 6y = 18$
$-6y = 18$
$y = -3$

7. $y > -\frac{1}{4}x + 4$

dashed

m = slope, b = y-intercept

Down 1, Right 4



Check: (0, 5)
$(5) > -\frac{1}{4}(0) + 4$
$5 > 4$
TRUE

Check: (0, 0)
$(0) > -\frac{1}{4}(0) + 4$
$0 > 4$
False

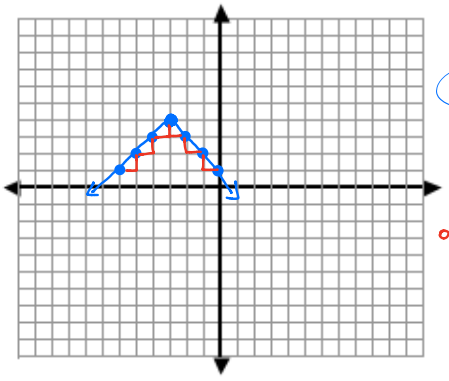
8. $y = -|x + 3| + 4$

Vertex
(-3, 4)

a = -1
So we move
Down 1,
R+/Left 1
or make a Table

x	y
-5	2
-4	3
-3	4
-2	3
-1	2

Vertex



9. $y > -6$

Cross y-axis at -6

dashed

Check: (0, 0)
$(0) > -6$
TRUE

Check: (0, -7)
$(-7) > -6$
False

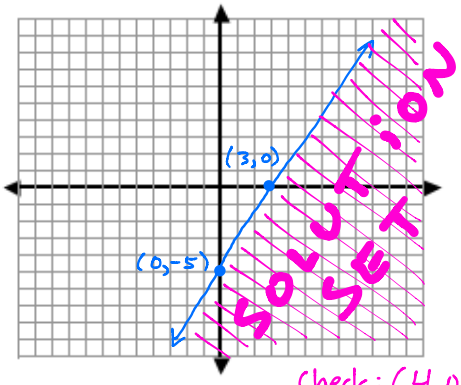
10. $5x - 3y \geq 15$

Solid

Check: (0, 0)
$5(0) - 3(0) \geq 15$
$0 \geq 15$
FALSE

x-intercept
(3, 0)
$5x - 3(0) = 15$
$5x = 15$
$x = 3$

y-intercept
(0, -5)
$5(0) - 3y = 15$
$-3y = 15$
$y = -5$



Check: (4, 0)
$5(4) - 3(0) \geq 15$
$20 \geq 15$ TRUE

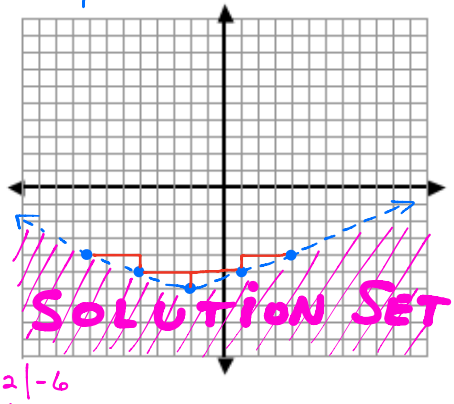
11. $y < \frac{1}{3}|x + 2| - 6$

dashed

Rise = 1, Run = 3 (Up 1, R+/Left 3)

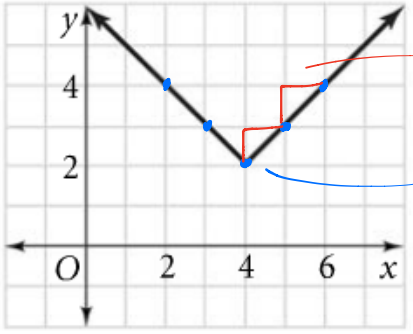
a like "slope"

Vertex: (-2, -6)



Check: (0, -8)
$(-8) < \frac{1}{3}|0 + 2| - 6$
$-8 < \frac{1}{3}|2| - 6$
$-8 < \frac{1}{3} - 6$
$-8 < -5\frac{1}{3}$ TRUE

12. Using the parent graph of y = |x| as your base…what is the equation for the following graph.



Slope: $\frac{1}{1}$ or 1

Vertex: (4, 2) (h, k)

$a = 1$
$h = 4$
$k = 2$

$y = 1|x-4|+2$

Evaluate the function if f(x) = 3 – 5x and $g(x) = \frac{x^2+5}{x}$

13. $f(4) = 3-5(4)$
$= 3-20$
$f(4) = -17$

14. g(-5) - f (3)

$\frac{(-5)^2+5}{(-5)} - (3-5(3))$

$\frac{25+5}{-5} - (3-15)$

$\frac{30}{-5} - (-12)$

$-6 + 12 = 6$

15. Alexandra has a college savings account. After 3 years she has $2569 in the account. After 10 years she has $7630.

a) Write a linear equation in slope-intercept form for the amount of money saved (y) after (t) years. (Hint…find the slope first!)

(3, 2569) (10, 7630)
x_1 y_1 x_2 y_2

$m = \frac{7630-2569}{10-3} = \frac{5061}{7} = 723$

choose (3, 2569)

$y - 2569 = 723(x-3)$

$y - 2569 = 723x - 2169$
$+2569 \quad +2569$

$y = 723x + 400$

b) How much money will Alexandra have after 18 years?

Slope-Intercept

$y = 723(18) + 400$
$y = 13014 + 400$
$y = \$13,414$

OR

Point-Slope

$y - 2569 = 723(18-3)$
$y - 2569 = 723(15)$
$y - 2569 = 10845$
$+2569 \quad +2569$
$y = \$13,414$

After 18 years, she will have $13,414

16. Larry is going on a backpacking trip and will need to carry enough water for the duration of the trip. He figures he will need at least 180 oz. of water total. A small bottle holds 12 oz. of water, while a large bottle holds 20 oz. of water.

a. Write an inequality relating the number of small bottles (x) and the number of large bottles (y) needed to meet his water needs.

x = # of small bottles
y = # of large bottles

$12x + 20y \geq 180$

b. Graph the inequality…don't forget to label your axes.

OR $\frac{20y}{20} \geq \frac{-12x}{20} + \frac{180}{20}$

$y \geq -\frac{3}{5}x + 9$

x-intercept: (15, 0)

$12x + 20(0) = 180$

$12x = 180$

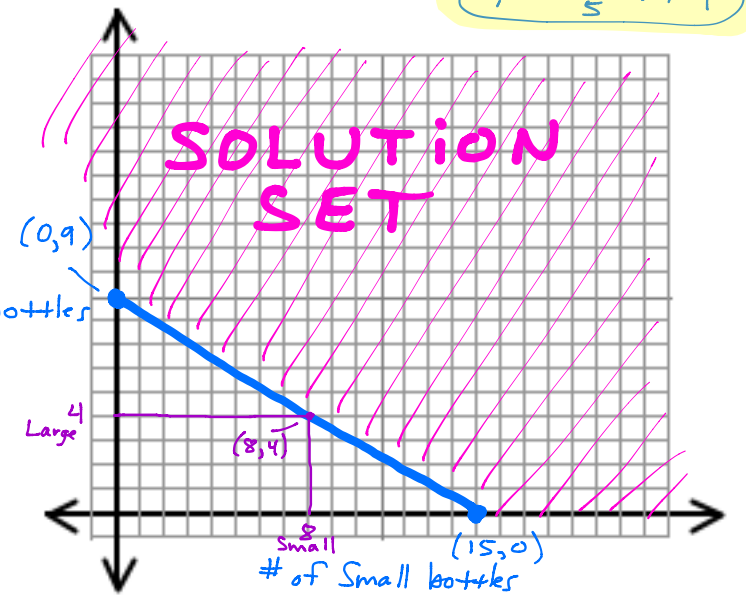
$x = 15$

y-intercept: (0, 9)

$12(0) + 20y = 180$

$\frac{20y}{20} = \frac{180}{20}$

$y = 9$



c. Use the graph to answer the question. If Larry only has 4 large water bottles, what is the minimum number of small water bottles he will need to carry.

$12x + 20(4) \geq 180$

$12x + 80 \geq 180$

$-80 \quad -80$

$\frac{12x}{12} \geq \frac{100}{12}$

$x \geq 8.\overline{3}$

So, Larry needs to carry at least 9 small H_2O bottles

$x \geq 9$ small bottles