

BY: STUDY-HACK.COM

MAKING & USING A STUDY GUIDE for a test -2

Exam-2: Analyzing Functions

Study Guide: helps you ① summarize,
② visualize, and ③ analyze ③
concepts learned in class

* Warning: simply making a study guide
does not guarantee you an
A+ on the test.

1

Find the slope of the line that passes through the two points.

$(-7, 9)$ and $(-9, 21)$

(x_1, y_1) (x_2, y_2)

-6

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{21 - 9}{-9 - (-7)} = \frac{12}{-2} = -6$$

$\rightarrow -9 + 7$

The slope is -6 .

2

Find the slope of the line that passes through the two points.

$(7, -7)$ and $(2, -6)$

(x_1, y_1) (x_2, y_2)

-0.2

$$m = \frac{y_1 - y_2}{x_1 - x_2} = \frac{-6 - (-7)}{2 - 7} = \frac{-6 + 7}{-5} = \frac{1}{-5} = -0.2$$

3

Find the slope of the line that passes through the two points.

$(0, 8)$ and $(-9, -1)$

(x_1, y_1) (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 8}{-9 - 0} = \frac{-9}{-9} = 1$$

4

Find the x - and y -intercepts for the equation.

$$3x + 4y = 96$$

x-intercept:

$$\text{Set } y = 0$$

$$3x + 4(0) = 96$$

$$\cancel{3}x = \frac{96}{\cancel{3}}$$

$$x = 32$$

y-intercept:

$$\text{Set } x = 0$$

$$3(0) + 4y = 96$$

$$\cancel{4}y = \frac{96}{\cancel{4}}$$

$$y = 24$$

The x -intercept is .The y -intercept is .

5

Find the slope and y-intercept.

$$2y + 6x = 1$$

Solve for y:

$$\begin{array}{r} 2y + 6x = 1 \\ \underline{-6x} \\ 2y \end{array} \qquad \begin{array}{r} + 6x = 1 \\ \underline{-6x} \\ + 1 \end{array}$$

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

Slope

y-intercept

The slope is .The y-intercept is .

6

Drag and drop the correct notation into each box for every description of the interval shown on the number line.



● = Close Dot = \leq, \geq or $[,]$

○ = Open Dot = $<, >$ or $(,)$

Inequality:

$$x \geq 4$$

Set notation:

$$\{x \mid x \geq 4\}$$

Interval notation:

$$[4, +\infty)$$

same

7

x is the middle

Select the interval $(8, 900]$ as an inequality and using set notation.

Inequality: $8 < x \leq 900$ ▼

Set notation: $\{x \mid 8 < x \leq 900\}$ ▼

8

Select the interval $-28 \leq x < 50$ using set notation and interval notation.

Set notation: $\{x \mid -28 \leq x < 50\}$ *same*

Interval notation: $[-28, 50)$

9

Select the interval $\{x | -8 < x < 6\}$ as an inequality and using interval notation.

Inequality:

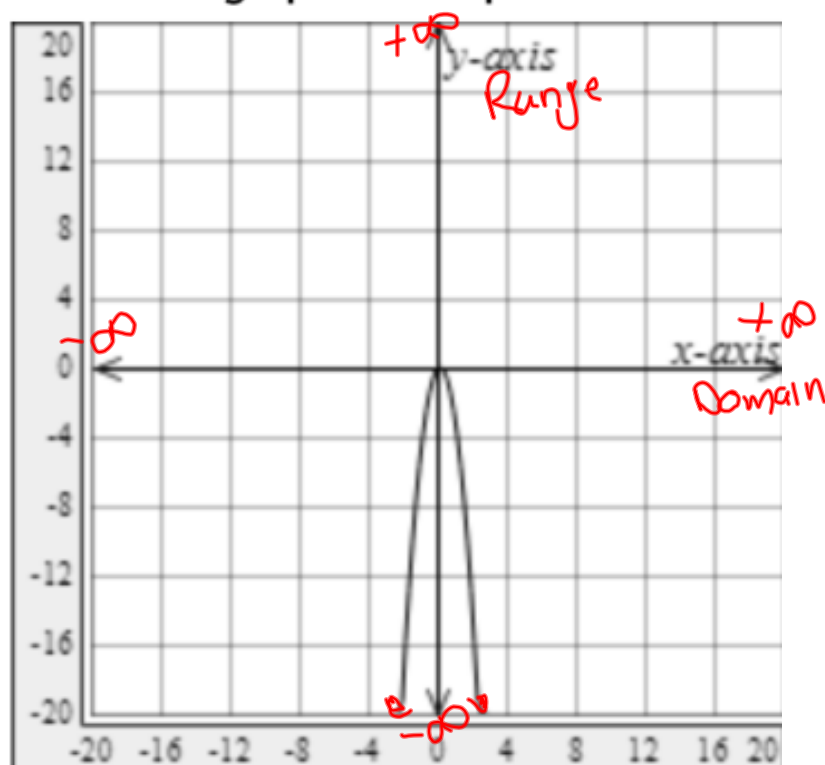
Same

Interval notation:

10

Select the domain and the range of the function as an inequality, using set notation, and using interval notation. Also, select the end behavior of the function.

The graph of the quadratic function $f(x) = -4x^2$ is shown.



Domain:

Inequality: $-\infty < x < +\infty$ ▼

Set notation: $\{x \mid -\infty < x < +\infty\}$ ▼

Interval notation: $(-\infty, +\infty)$ ▼

going down
down
on left/right

Range:

Inequality: $-\infty < y \leq 0$ ▼

Set notation: $\{y \mid -\infty < y \leq 0\}$ ▼

Interval notation: $(-\infty, 0]$ ▼

Below
zero

End behavior:

As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ ▼

As $x \rightarrow +\infty, f(x) \rightarrow -\infty$ ▼

going
down

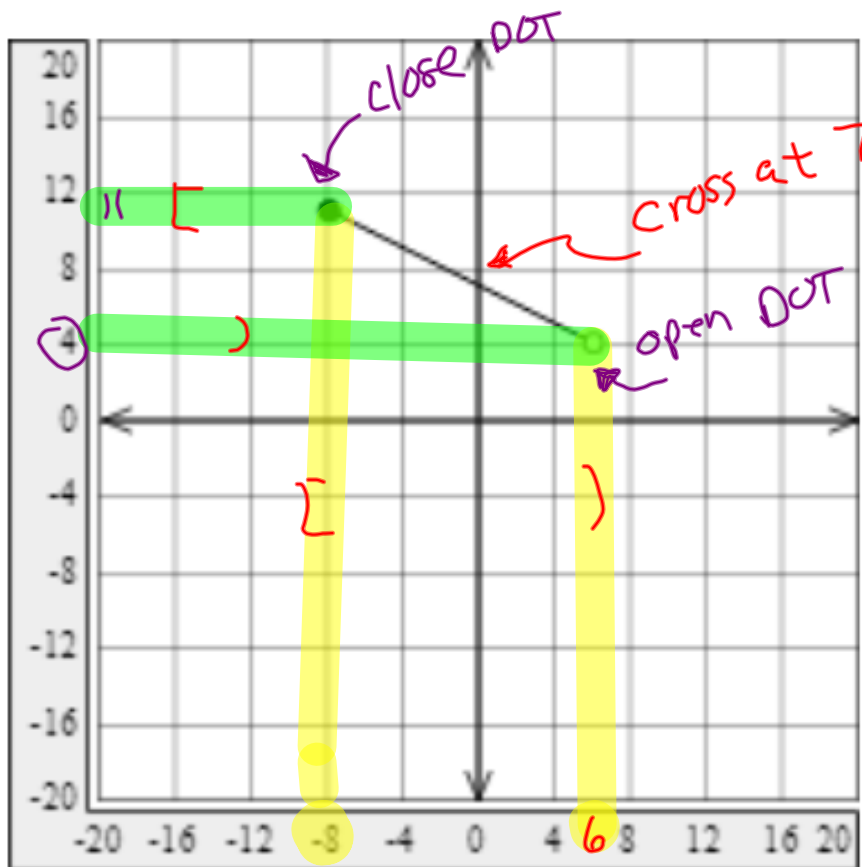
11

$f(x) = -\frac{1}{2}x + 7$ with domain $-8 \leq x < 6$

Slope \uparrow
 y-intercept \uparrow

\bullet $\circ \leftarrow$ DOT TYPE

Graph from $x = -8$ to $x = 6$



Part 2 ✓

Identify the range.

The range is $4 < y \leq 11$.

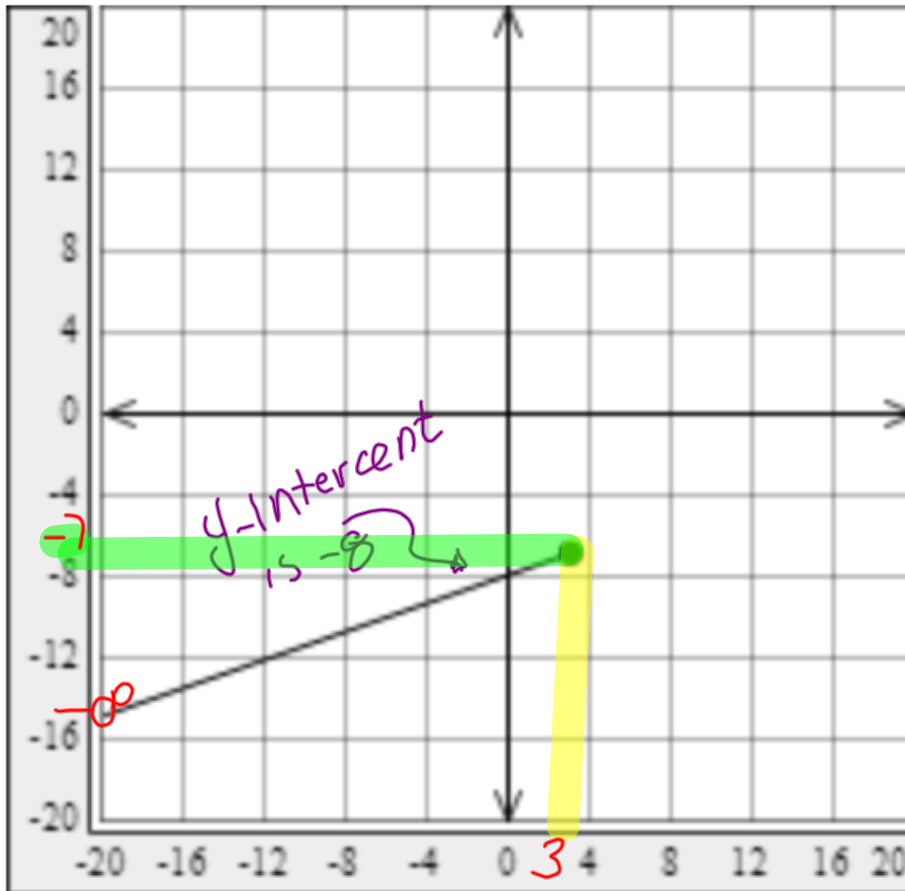
12

slope \swarrow \nwarrow *y-int.*

$$f(x) = \frac{1}{3}x - 8 \text{ with domain } (-\infty, 3].$$

∞ *Down*

Part 1 out of 2
Select the graph.



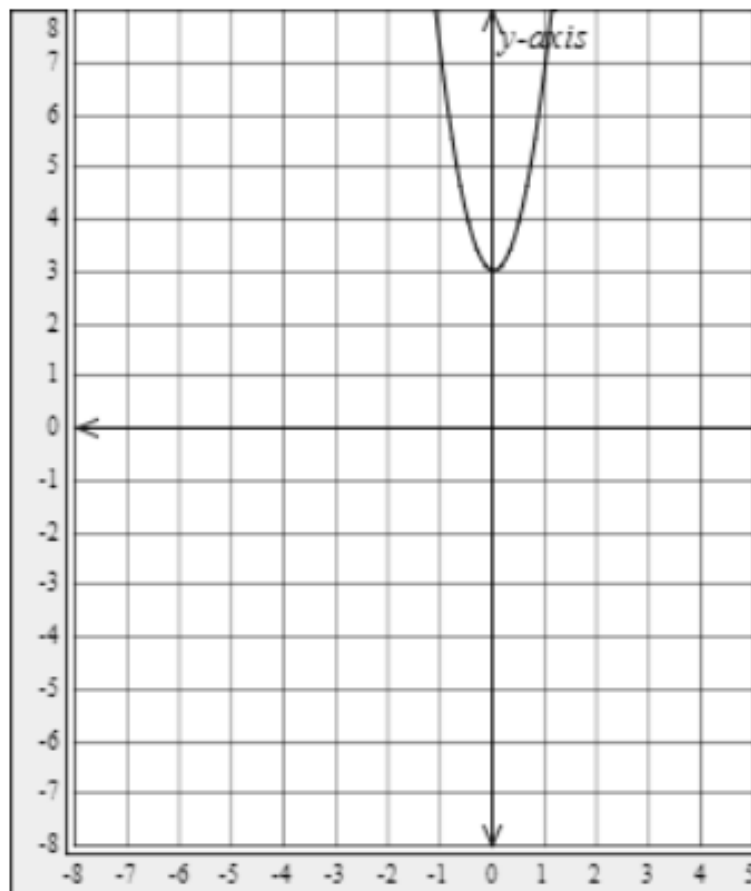
Part 2 ✓

Identify the range.

The range is .

13

The graph of the quadratic function $f(x) = 4x^2 + 3$ is shown.



Domain:

Inequality: $-\infty < x < +\infty$ ▼

Set notation: $\{x \mid -\infty < x < +\infty\}$ ▼

Interval notation: $(-\infty, +\infty)$ ▼

Range:

Inequality: $3 \leq y < +\infty$ ▼

Set notation: $\{y \mid 3 \leq y < +\infty\}$ ▼

Interval notation: $[3, +\infty)$ ▼

End behavior:

As $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$ ▼

As $x \rightarrow +\infty$, $f(x) \rightarrow +\infty$ ▼

14

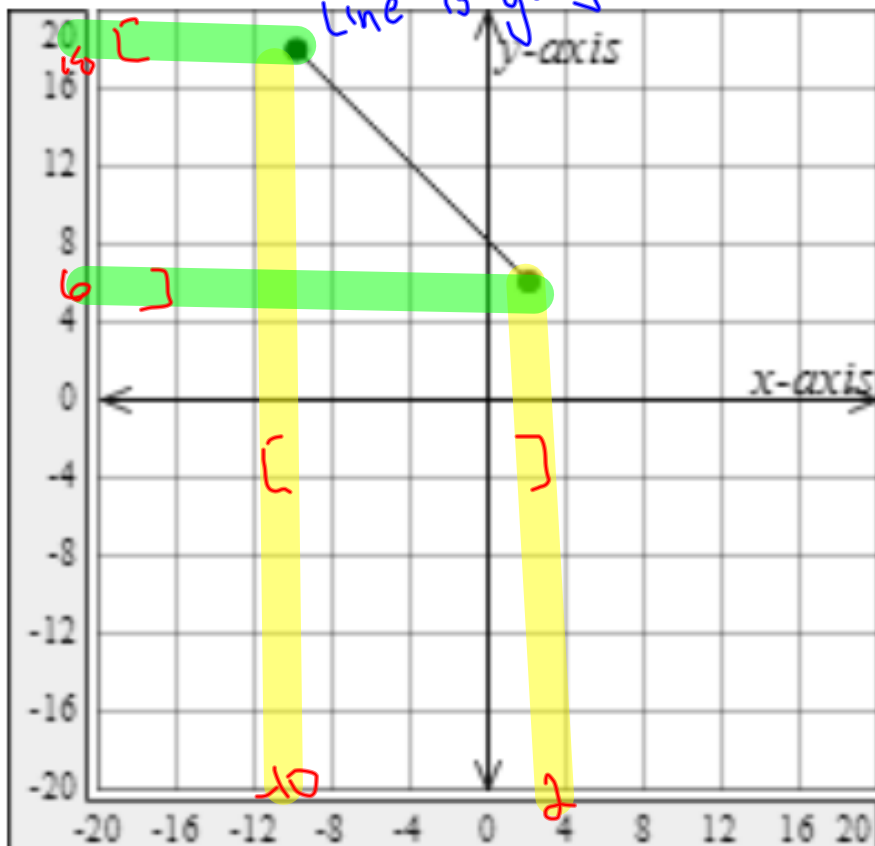
$f(x) = -x + 8$ with domain $[-10, 2]$

close interval =

Part 1 out of 2
Select the graph.

*Slope = Negative
Line is going Down.*

y-int.



Part 2 out of 2
Identify the range.

The range is .

15

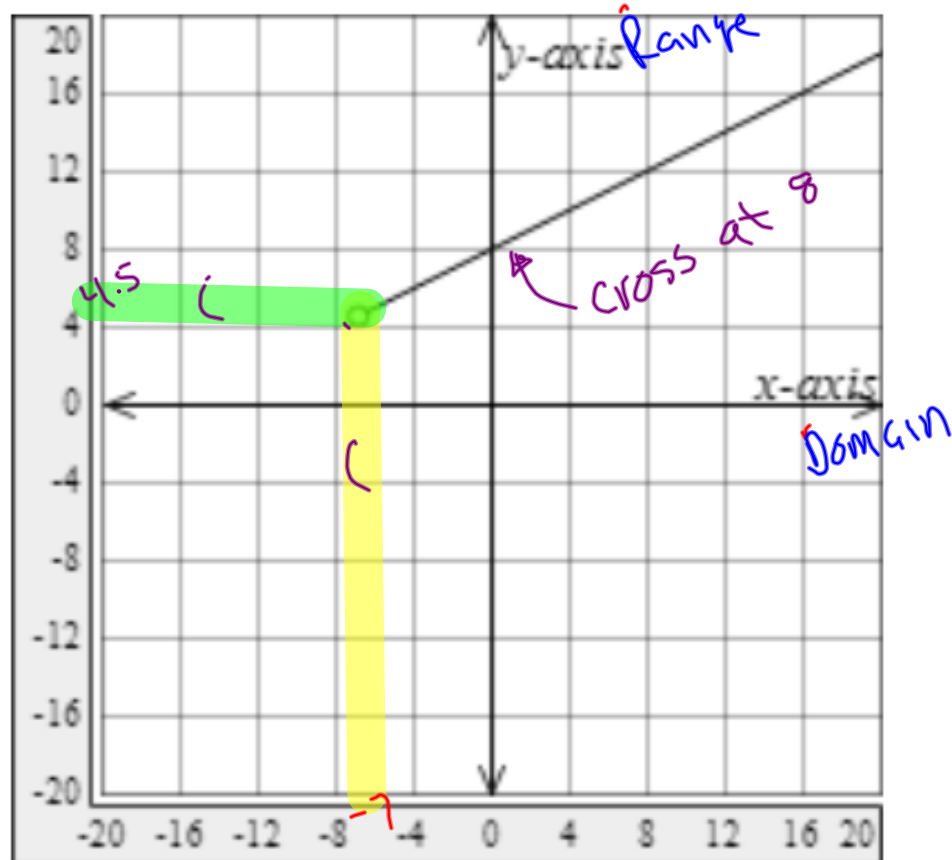
$$f(x) = \frac{1}{2}x + 8 \text{ with domain } \{x | x > -7\}$$

Part 1 out of 2
Select the graph.

Slope is positive

Cross y-axis at 8

Open dot =
at -7 on x-axis



Part 2 out of 2
Identify the range.

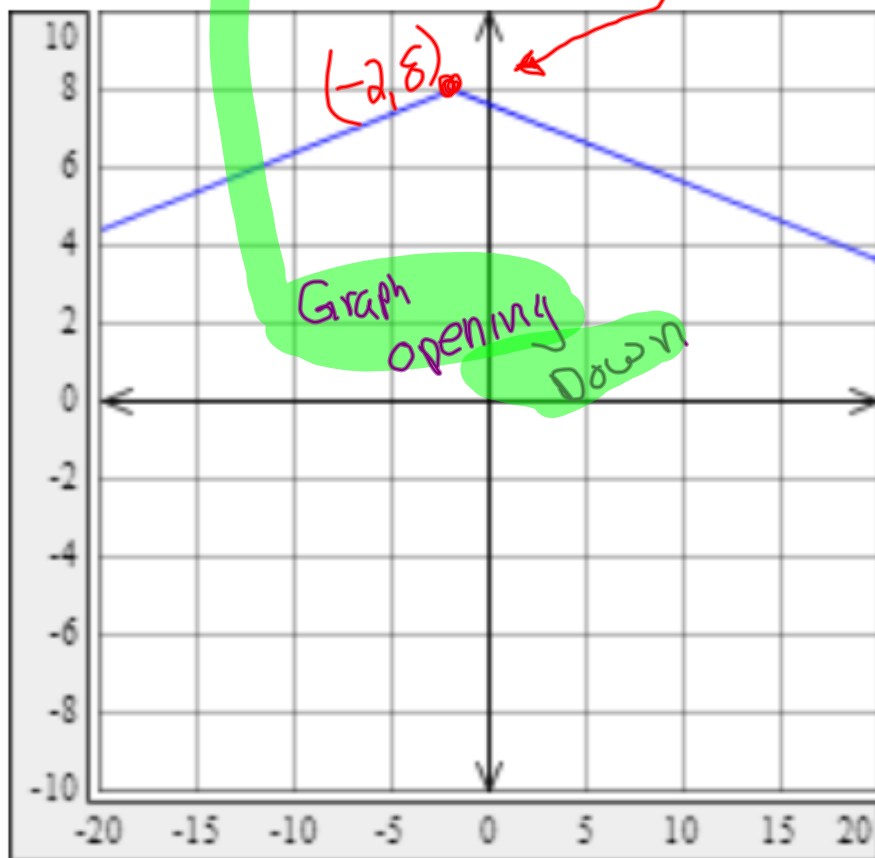
The range is $\{y | y > 4.5\}$.

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$$g(x) = -\frac{1}{5}|x + 2| + 8$$

Switch sign

The vertex is located at $(-2, 8)$.



Two other points are

$(8, 6)$ and $(-12, 6)$

(x, y)

$$y = -\frac{1}{5}|8 + 2| + 8$$

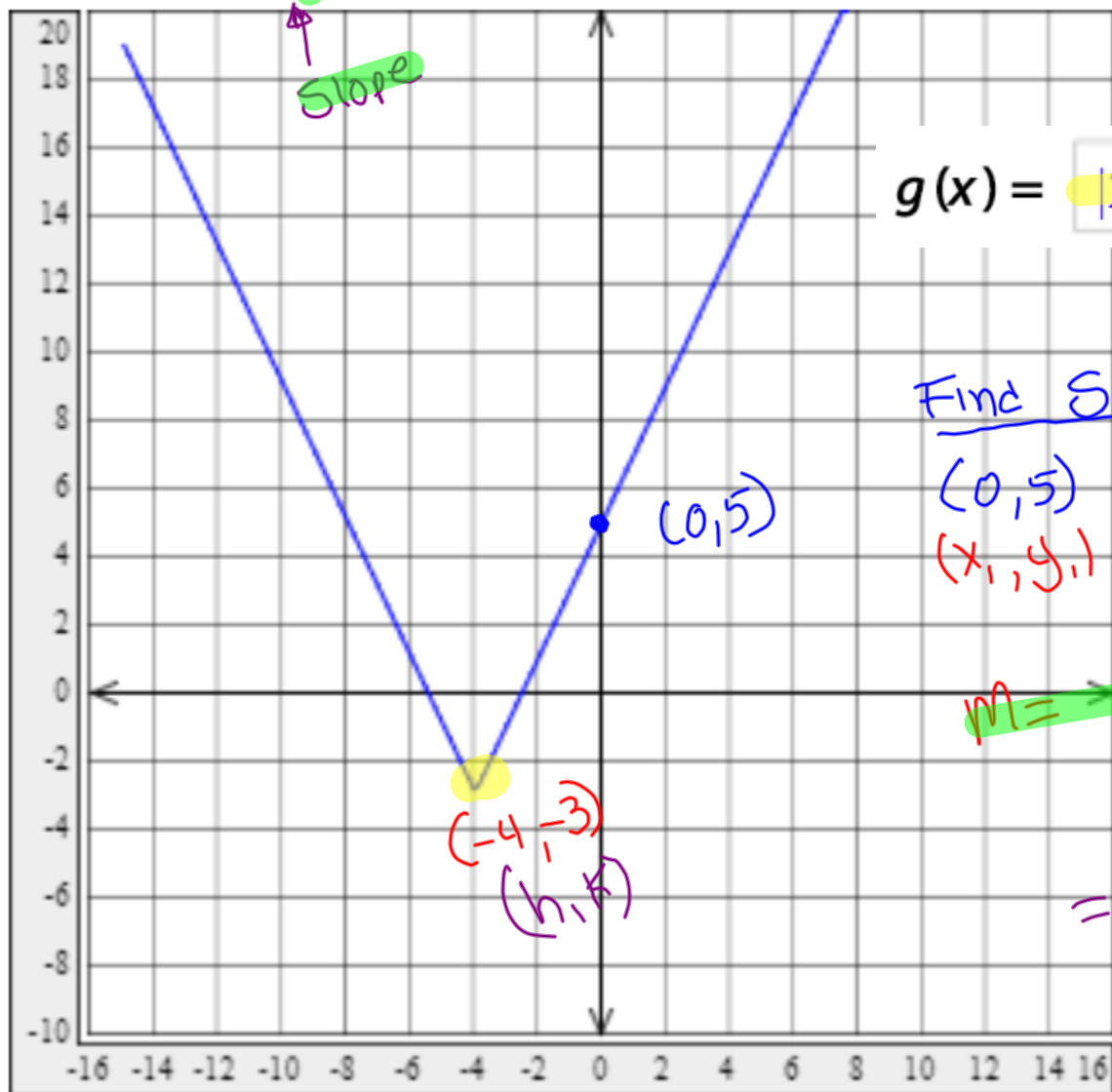
$$= -\frac{1}{5}|10| + 8$$

$$= -\frac{10}{5} + 8 = -2 + 8 = 6$$

Same for both

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$$g(x) = \left| \frac{1}{b} (x - h) \right| + k \Rightarrow |2(x+4)| - 3$$



$$g(x) = |2(x+4)| - 3$$

Find Slope of:
 $(0, 5)$ and $(-4, -3)$
 (x_1, y_1) and (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 5}{-4 - 0} = \frac{-8}{-4} = 2$$

18

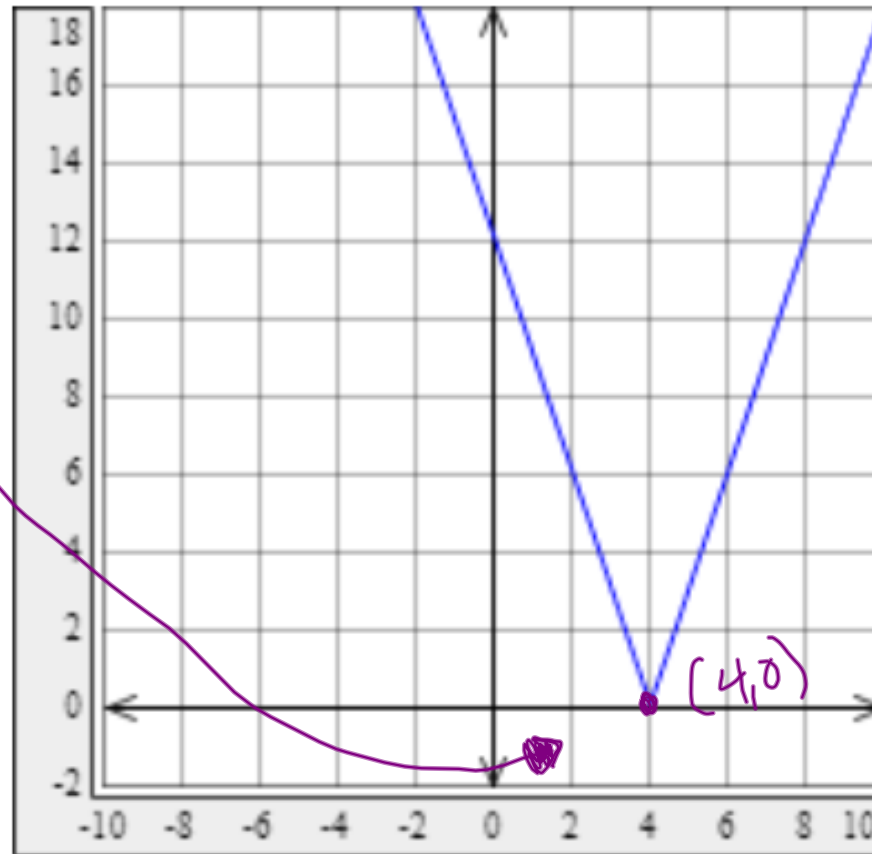
Predict what the graph of the function $g(x) = 3|x - 4|$ will look like then select the graph of the function

The graph of $g(x) = 3|x - 4|$ is the graph of $f(x) = |x|$ shifted units to the .

opp. Direction

The graph is then stretched by a factor of .

Vertex (4,0)



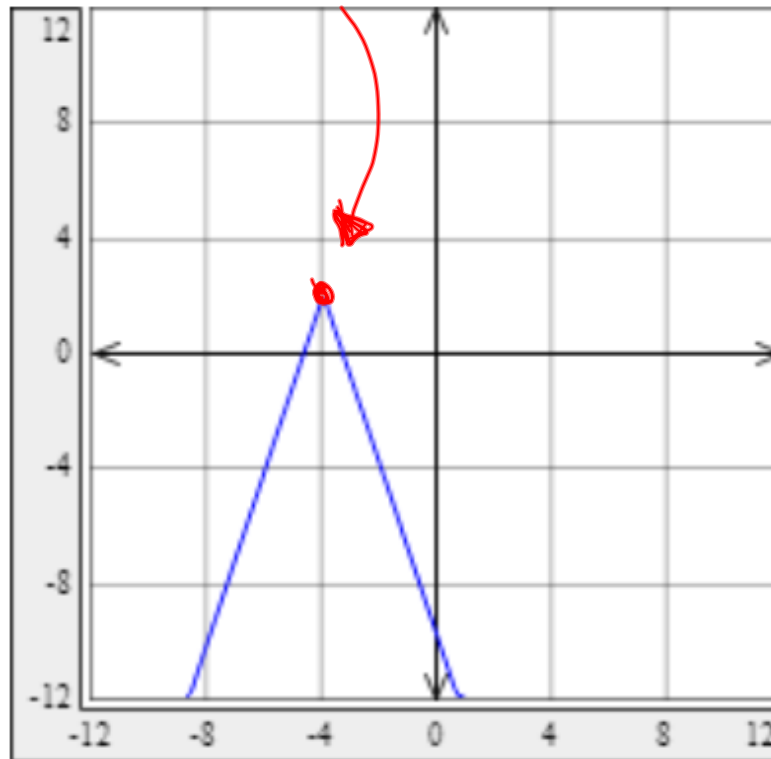
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Predict what the graph of the function $g(x) = -3|x + 4| + 2$ will look like then select the graph of the function.

$g(x)$ is the graph of $f(x) = |x|$ shifted units to the , vertically stretched by a factor of , reflected across the axis, and units .

Vertex $(-4, 2)$ in Q. II

Opening Down



20

Drag and drop each function next to its corresponding graph.

$$y = |x - 2| - 3$$

Vertex

$$(2, -3)$$

QUADRANT

IV

$$y = |x - 2| + 3$$

$$(2, 3)$$

I

$$y = |x + 2| + 3$$

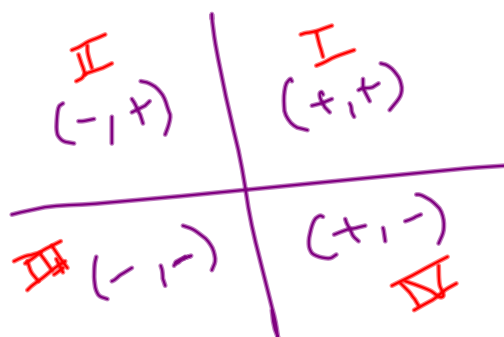
$$(-2, 3)$$

II

$$y = |x + 2| - 3$$

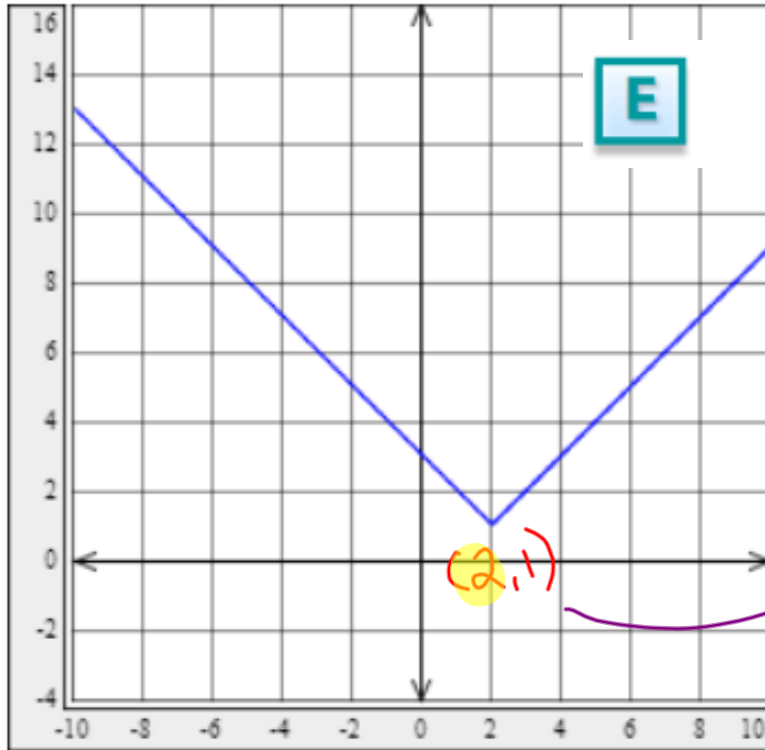
$$(-2, -3)$$

III



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$y = |x + 2| + 1$ vertex: $(-2, 1)$



The **x-coordinate** of the vertex is incorrect.

$y = |x - 2| + 1$

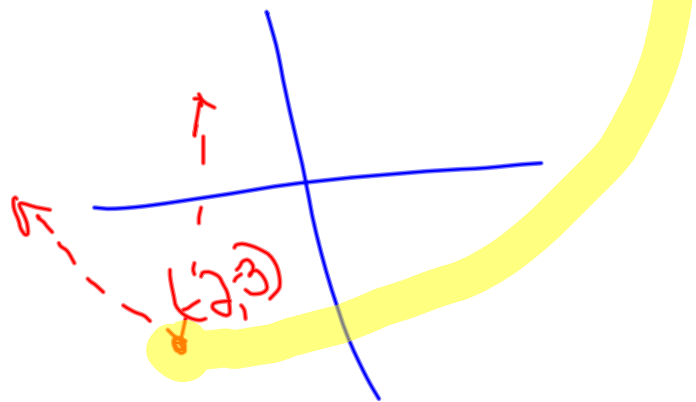
Correct

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Select the graph for the given function and identify the domain and range.

$$g(x) = \left| -\frac{7}{3}(x + 2) \right| - 3$$

Slope opening-up
 vertex $(h, k) = (-2, -3)$
 opposite sign



Down $-|x|$
 Up $|x|$
~~^~~ ~~v~~

Side Notes

Slope Outside

$$y = \frac{a}{b} |x - h| + k$$

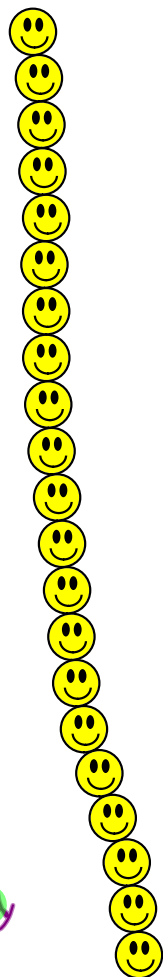
|
Slope

$a > b$ stretched

$a < b$ compressed

ex: $g(x) = \frac{7}{4} |x - 6| - 2$

$7 > 4$ stretched



Slope Inside

$$y = \left| \frac{a}{b} (x - h) \right| + k$$

|
Slope

$a > b$ compressed

$a < b$ stretched

ex: $g(x) = \left| \frac{9}{7} (x - 6) \right| + 4$

$9 > 7$ compressed



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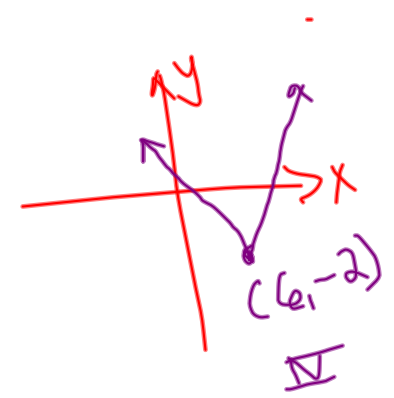
Predict what the graph of the function $g(x) = \frac{7}{4}|x - 6| - 2$ will look like then select the graph of the function.

$g(x)$ is the graph of $f(x) = |x|$ shifted 6 units to the right.

A The graph is vertically stretched by a factor of $\frac{7}{4}$.

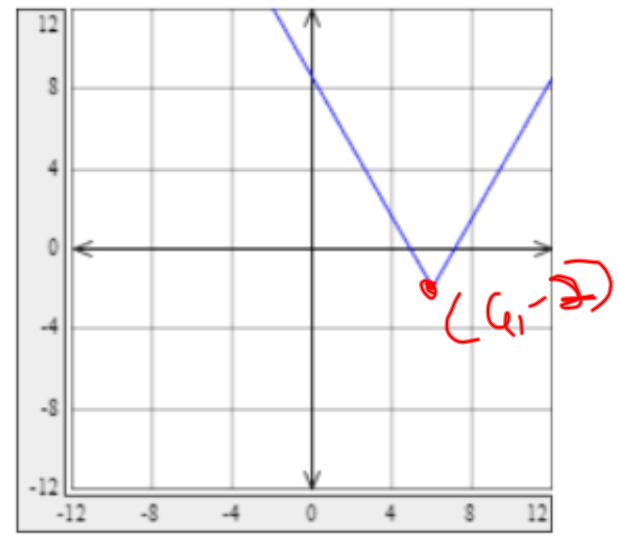
B The graph is vertically compressed by a factor of $\frac{4}{7}$.

The graph is then shifted 2 units down.



$m = \frac{\text{NUMERATOR bigger}}{\text{DENOMINATOR}}$ Open NARROW

$m = \frac{\text{NUMERATOR}}{\text{DENOMINATOR bigger}}$ Open wider



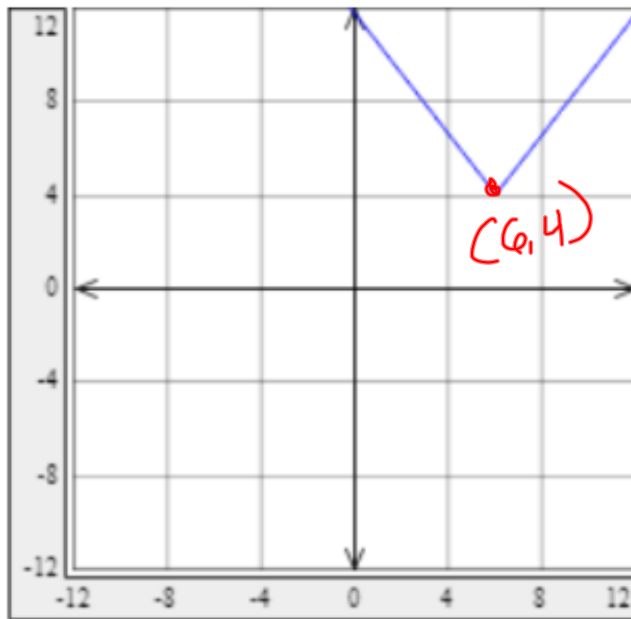
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Predict what the graph of the function $g(x) = \left| \frac{9}{7}(x - 6) \right| + 4$ will look like then select the graph of the function.



- A** $g(x)$ is the graph of $f(x) = |x|$ first horizontally compressed by a factor of $\frac{7}{9}$.
- B** $g(x)$ is the graph of $f(x) = |x|$ first horizontally stretched by a factor of $\frac{9}{7}$.

The graph is shifted units to the and units .



25

A grocery store stocks shelves with 80 cartons of strawberries before the store opens. For the first 3 hours the store is open, the store sells 20 cartons per hour. Over the next 2 hours, no cartons of strawberries are sold. The store then restocks 20 cartons each hour for the next 2 hours. In the final hour that the store is open, 10 cartons are sold. Graph the function.

