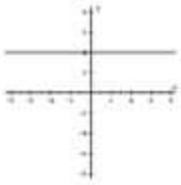
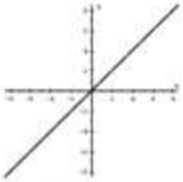
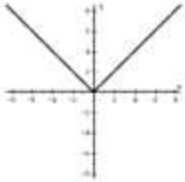
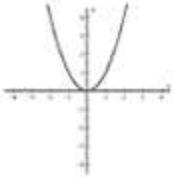
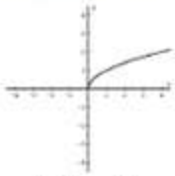
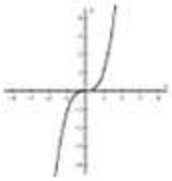
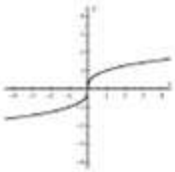
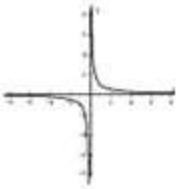
3.4 PIECEWISE FUNCTIONS MATH 161 THOMPSON

Constant  $f(x) = c$	Identity  $f(x) = x$	Absolute Value  $f(x) = \|x\|$	Quadratic  $f(x) = x^2$
Square Root  $f(x) = \sqrt{x}$	Cubic  $f(x) = x^3$	Cube Root  $f(x) = \sqrt[3]{x}$	Reciprocal/Inverse/ Rational  $f(x) = \frac{1}{x}$

1) List the intercepts of $y = 2x^3 - 16$

Set x=0 to find y-intercept → y = -16 → point (0,-16)

Set y=0 to find x-intercept → $0=2x^3 - 16$

$2x^3 = 16$ divide by 2 first

$x^3 = 8$ take cube root of 8

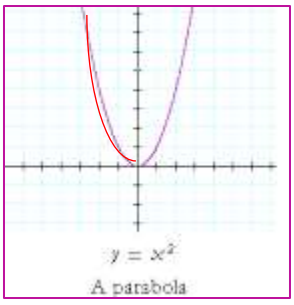
x = 2 (2,0)

Calculator for cube root:

3 2^{nd} ^ 8 = 2

2) The function $f(x)= x^2$ is decreasing on the interval (-∞,0)

Decreases on the left



Increasing and Decreasing intervals always use parenthesis

3) Determine whether the statement below is true or false.

The cube root function is odd and is decreasing on the interval $(-\infty,\infty)$.

Choose the correct answer below.

Cube root only increases

- True
- False

4) Decide whether the following statement is true or false.

The domain and the range of the reciprocal function are the set of all real numbers.

Choose the correct answer below.

Reciprocal doesn't equal zero

- True
- False

5) Which of the following functions has a graph that is symmetric about the y-axis?

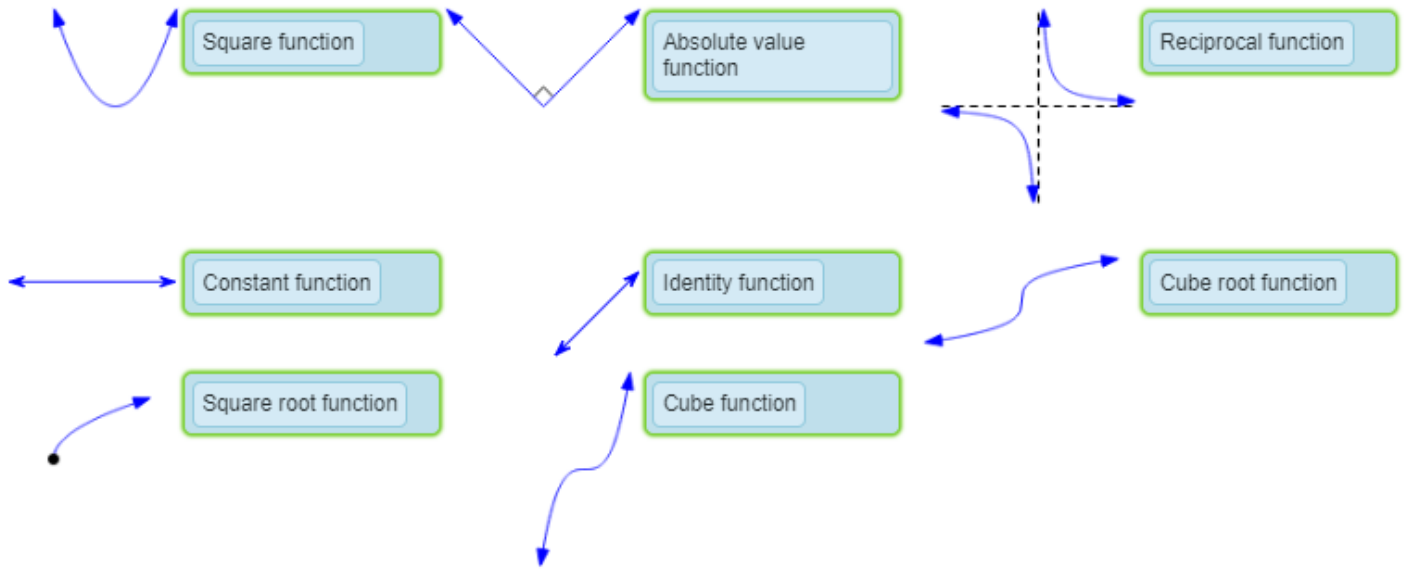
Select all that apply.

- A. $y = x^3$
- B. $y = |x|$
- C. $y = \frac{1}{x}$
- D. $y = \sqrt{x}$

Look at the graphs top of page

find the one that you can rotate are the y-axis

6) Drag the function to the appropriate area below.



7) Graph the function. Be sure to label three points on the graph.

$f(x) = x$

Given the x-coordinates, determine the y-coordinates of the three points on the graph.

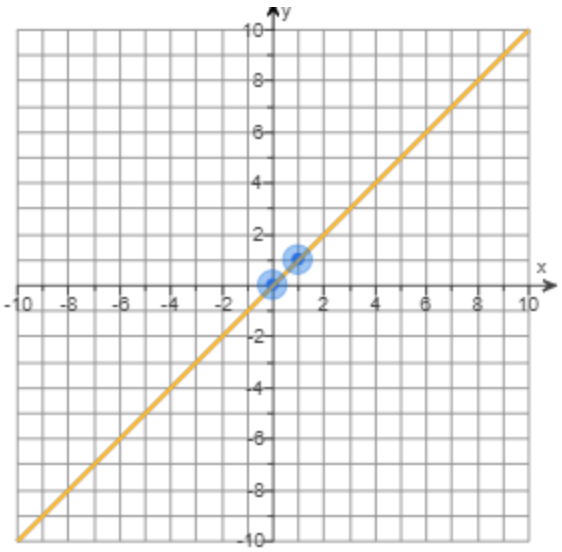
x	y
0	0
1	1
2	2

$f(0) = 0$

$f(1) = 1$

$f(2) = 2$

(Simplify your answers. Type integers or decimals.)



Plot two of the three points and a line if formed

8) Graph the function. Be sure to label three points on the graph.

$f(x) = x^2$

Given the x-coordinates, determine the y-coordinates of the three points on the graph.

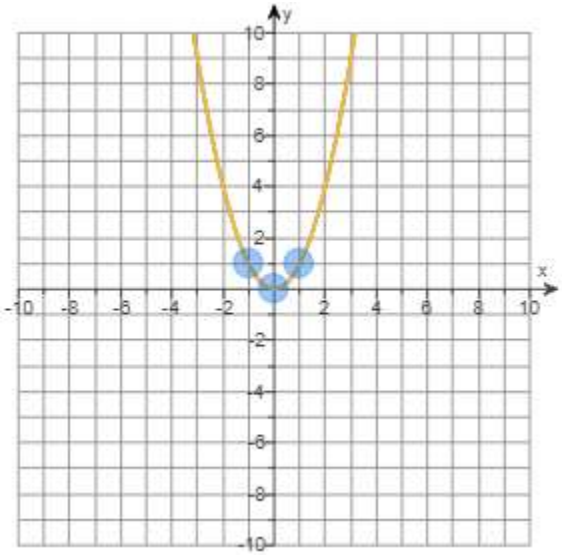
x	y
−1	1
0	0
1	1

$f(-1) = 1^2 = 1$

$f(0) = 0$

$f(1) = 1^2 = 1$

(Simplify your answers. Type integers or decimals.)



Plot all three points from left to right

9) Graph the function. Be sure to label three points on the graph.

$f(x) = x^3$

Given the x-coordinates, determine the y-coordinates of the three points on the graph.

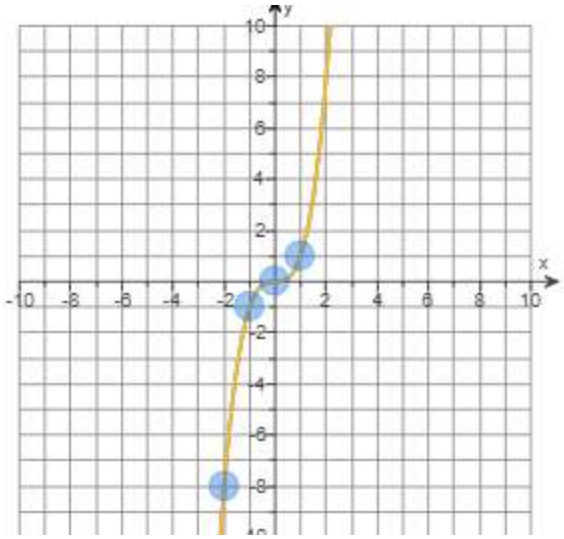
x	y
−1	−1
0	0
1	1

$f(-1) = 1^3 = -1$

$f(0) = 0$

$f(1) = 1^3 = 1$

(Simplify your answers. Type integers or decimals.)



have to plot 4 points

the 3 above and f(-2) = -8

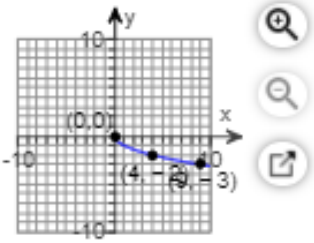
Plot from left to right

10) Graph the function. Be sure to label three points on the graph.

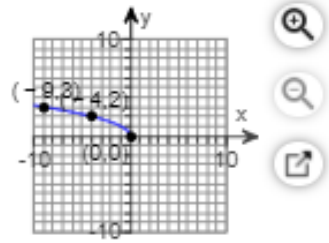
$f(x) = \sqrt{x}$ Can't take square root of a negative #, all x have to be positive

Choose the correct graph below.

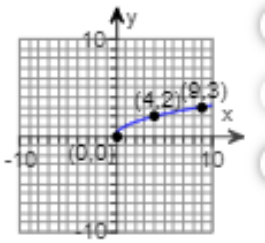
A.



B.



C.

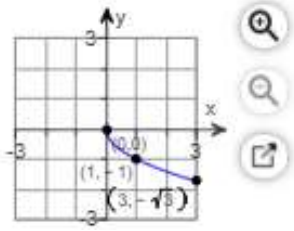


11) Graph the function. Be sure to label three points on the graph.

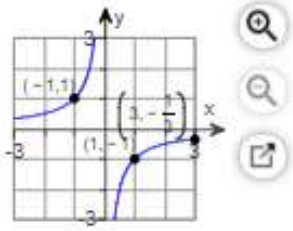
$f(x) = \frac{1}{x}$

Choose the correct graph below.

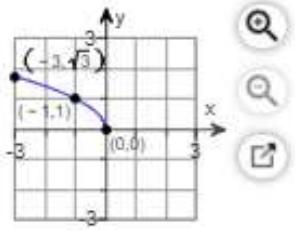
A.



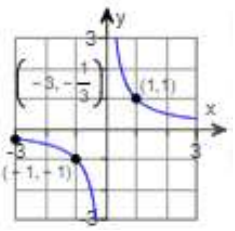
B.



C.



D.

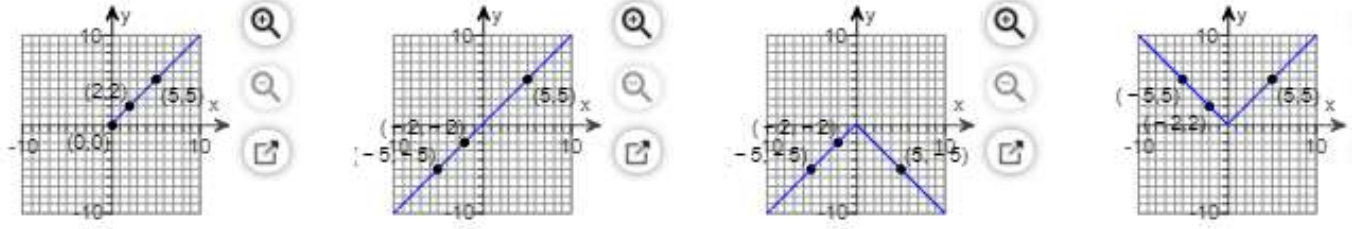


12) Graph the function. Be sure to label three points on the graph.

$f(x) = |x|$

Choose the correct graph below.

A. B. C. D. ✔



13) Graph the function. Be sure to label three points on the graph.

$f(x) = \sqrt[3]{x}$

Choose the correct graph below.

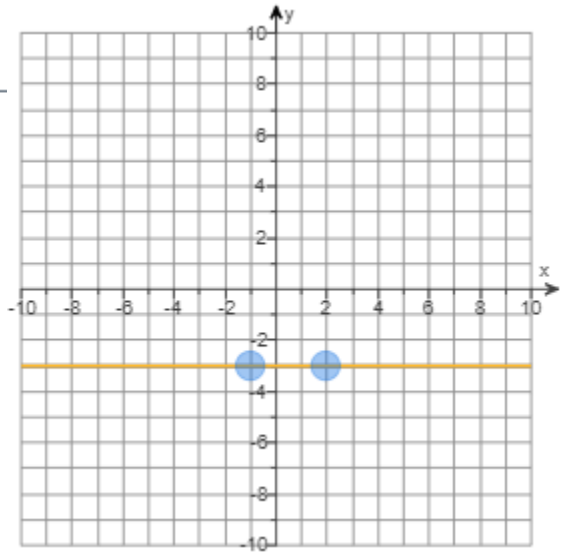
A. B. C. D. ✔

14) Graph $y = f(x)$ by hand by first plotting points to determine the shape of the graph.

$f(x) = -3$

Use the graphing tool to graph the equation.

Plot -3 on y-axis and any other point to the right or left



15) The function $f(x) = |x|$ is called the absolute value function.

16) The graph of the linear function $f(x) = b$ is a(n) horizontal line.

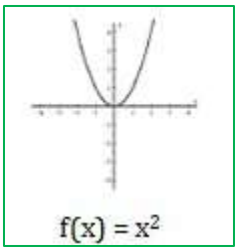
The graph of the linear function $y = b$ is a horizontal line, with y-intercept b and slope 0.

17) The function $f(x) = x^2$ is decreasing on $(-\infty, 0)$.

Choose the correct answer below.

- A. False, because the function $f(x) = x^2$ is increasing on $(-\infty, 0)$, decreasing on $(0, \infty)$, and $f(0) = 0$ is a relative minimum of f.
- B. True, because the function $f(x) = x^2$ is a decreasing function on $(-\infty, \infty)$.
- C. True, because the function $f(x) = x^2$ is decreasing on $(-\infty, 0)$, increasing on $(0, \infty)$, and $f(0) = 0$ is a relative minimum of f.

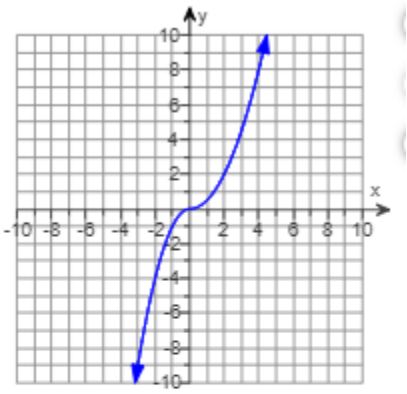
Decreasing on left



$f(x) = x^2$

Increasing on the right

18) Use the graph of the function to find the following.



$f(-1) =$ -1

What is the domain?

- A. All real numbers
- B. $\{x \mid -10 < x \leq 10\}$
- C. $\{x \mid -\infty < x \leq 0\}$
- D. $\{x \mid 0 \leq x < \infty\}$

Find all x-values such that $f(x) = 2$.

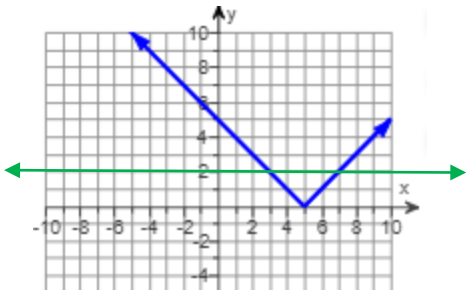
$x =$ 2

(Use a comma to separate answers as needed.)

What is the range?

- A. $\{y \mid -10 < y \leq 10\}$
- B. All real numbers

19) Use the graph to find the following.
a) f(3)
b) the domain
c) any x-values for which f(x) = 2
d) the range



f(3) = 2

What is the domain? Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

E. The domain is all real numbers.

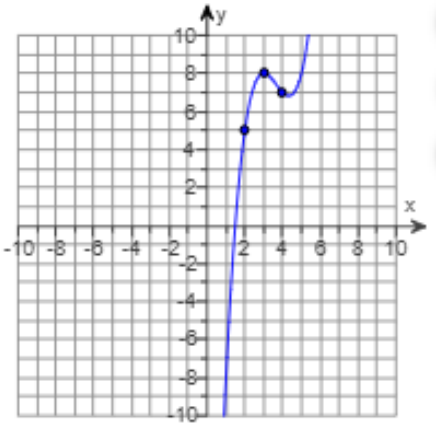
For what x-value(s) is f(x) = 2? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. x = 3,7 two answers
(Use a comma to separate answers as needed.)

What is the range? Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

D. $\{y \mid y \geq 0\}$

20) Use the graph of the function f shown to the right to find f(2), f(3), and f(4).



f(2) = 5

f(3) = 8

f(4) = 7