

Student: _____
 Date: _____

Instructor: Carlos Sotuyo
 Course: MAC2233 Calculus for Business, Social and Life Sciences

Assignment: Section 1.2 Elementary Functions: Graphs & Transformations

1. Find the domain and range of the function.

$$f(x) = -9|x| + 6$$

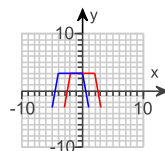
The domain of the function is _____.
 (Type your answer in interval notation.)

The range of the function is _____.
 (Type your answer in interval notation.)

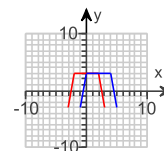
2. The graph of $y = f(x)$ is shown in red. Graph $y = f(x) + 2$.

Choose the correct graph (in blue) on the right.

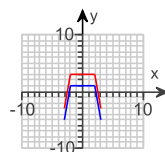
A.



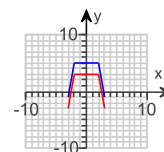
B.



C.



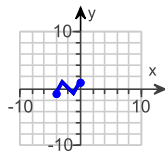
D.



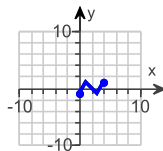
3. The graph of $y = f(x)$ is shown to the right. Graph $y = f(x) - 2$.

Choose the graph of $y = f(x) - 2$.

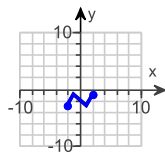
A.



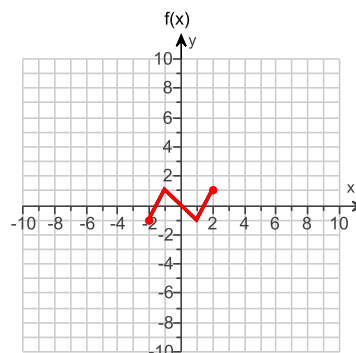
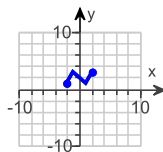
B.



C.



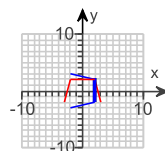
D.



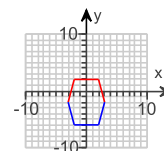
4. The graph of $y = f(x)$ is shown in red. Graph $y = -f(x)$.

Choose the correct graph (in blue) on the right.

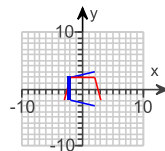
A.



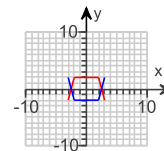
B.



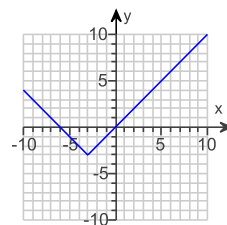
C.



D.



5. The graph to the right is the result of applying a sequence of transformations to the graph of one of the six basic functions. Identify the basic function and describe the transformation verbally. Write an equation for the given graph.



What is the basic function?

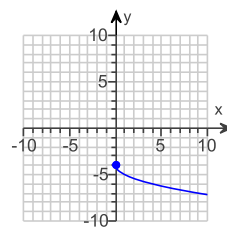
- A. Absolute value function $g(x) = |x|$
- B. Square root function $n(x) = \sqrt{x}$
- C. Cube function $m(x) = x^3$
- D. Cube root function $p(x) = \sqrt[3]{x}$
- E. Square function $h(x) = x^2$
- F. Identity function $f(x) = x$

Describe the transformation verbally. Select the correct choice below and fill in the answer boxes to complete your choice. (Type whole numbers.)

- A. The graph is shifted _____ unit(s) to the left and _____ unit(s) down.
- B. The graph is reflected in the x-axis and shifted _____ unit(s) to the right and _____ unit(s) up.
- C. The graph is reflected in the x-axis and shifted _____ unit(s) to the right and _____ unit(s) down.
- D. The graph is shifted _____ unit(s) to the left and _____ unit(s) up.

The equation for the given graph is $y =$ _____.

6. The graph to the right is the result of applying a sequence of transformations to the graph of one of the six basic functions. Identify the basic function and describe the transformation verbally. Write an equation for the given graph.



What is the basic function?

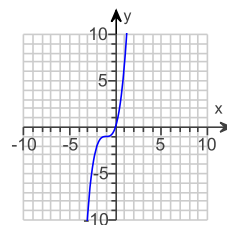
- A. Square function $h(x) = x^2$
- B. Identity function $f(x) = x$
- C. Cube function $m(x) = x^3$
- D. Absolute value function $g(x) = |x|$
- E. Cube root function $p(x) = \sqrt[3]{x}$
- F. Square root function $n(x) = \sqrt{x}$

Describe the transformation verbally. Select the correct choice below and fill in the answer box(es) to complete your choice. (Type whole numbers.)

- A. The graph is shifted _____ unit(s) up.
- B. The graph is reflected in the x-axis and shifted _____ unit(s) to the left and _____ unit(s) up.
- C. The graph is reflected in the x-axis and shifted _____ unit(s) down.
- D. The graph is shifted _____ unit(s) to the right and _____ unit(s) up.

The equation for the given graph is $y =$ _____.

7. The graph to the right is the result of applying a sequence of transformations to the graph of one of the six basic functions. Identify the basic function and describe the transformation verbally. Write an equation for the given graph.



What is the basic function?

- A. Absolute value function $g(x) = |x|$
- B. Cube function $m(x) = x^3$
- C. Square function $h(x) = x^2$
- D. Cube root function $p(x) = \sqrt[3]{x}$
- E. Identity function $f(x) = x$
- F. Square root function $n(x) = \sqrt{x}$

Describe the transformation verbally. Select the correct choice below and fill in the answer boxes to complete your choice. (Type whole numbers.)

- A. The graph is reflected in the x-axis and shifted _____ unit(s) to the right and _____ unit(s) up.
- B. The graph is shifted _____ unit(s) to the left and _____ unit(s) down.
- C. The graph is shifted _____ unit(s) to the left and _____ unit(s) up.
- D. The graph is reflected in the x-axis and shifted _____ unit(s) to the right and _____ unit(s) down.

The equation for the given graph is $y =$ _____.

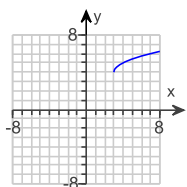
8. The graph of the function g is formed by applying the indicated sequence of transformations to the given function f . Find an equation for the function g and graph g using $-8 \leq x \leq 8$ and $-8 \leq y \leq 8$.

The graph of $f(x) = \sqrt{x}$ is shifted 3 units to the right and 4 units down.

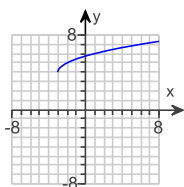
$g(x) =$ _____

Choose the correct graph below.

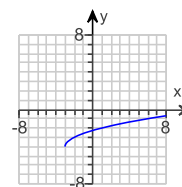
A.



B.



C.



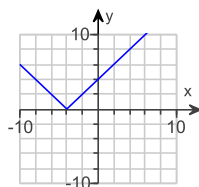
9. The graph of the function g is formed by applying the indicated sequence of transformations to the given function f . Find an equation for the function g and choose the graph of g using $-5 \leq x \leq 5$ and $-5 \leq y \leq 5$.

The graph of $f(x) = |x|$ is reflected in the x-axis and shifted to the left 4 units.

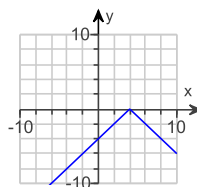
$g(x) =$ _____

Choose the graph of g below.

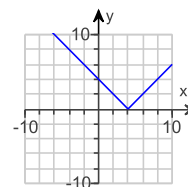
A.



B.



C.



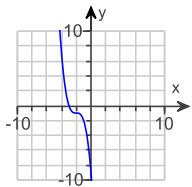
10. The graph of the function g is formed by applying the indicated sequence of transformations to the given function f . Find an equation for the function g and graph g using $-5 \leq x \leq 5$ and $-5 \leq y \leq 5$.

The graph of $f(x) = x^3$ is reflected in the x -axis and shifted 2 units to the right and down 1 unit.

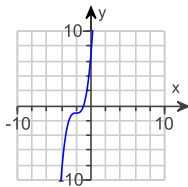
$g(x) =$ _____

Choose the correct graph of g .

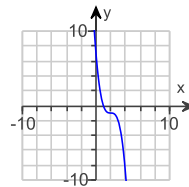
A.



B.



C.



11. Determine if reversing the order of the following two transformations can produce a different result.

vertical shift; horizontal shift

The result of a vertical shift followed by a horizontal shift would most naturally be denoted by (1) _____. The result of a horizontal shift followed by a vertical shift would most naturally be denoted by (2) _____. Therefore, reversing the order (3) _____ change the final result.

- (1) $f(-x) + k$. $A(f(x) + k)$. (2) $Af(x + h)$. $-(f(x) + k)$. $f(x + h) + k$. (3) does not
 $f(-x + h)$. $f(x + h) + k$. $Af(x) + k$. $-f(x + h)$. may
 $-(f(x) + k)$. $Af(x) + k$. $f(-x + h)$. $-f(x) + k$.
 $-f(x + h)$. $-f(x) + k$. $A(f(x) + k)$. $f(-x) + k$.

12. Determine if reversing the order of the following two transformations can produce a different result.

horizontal shift; reflection in the y -axis

The result of a horizontal shift followed by a reflection in the y -axis would most naturally be denoted by (1) _____. The result of a reflection in the y -axis followed by a horizontal shift would most naturally be denoted by (2) _____. Therefore, reversing the order (3) _____ change the final result.

- (1) $f(-x) + k$. $-(f(x) + k)$. (2) $Af(x + h)$. $-f(x) + k$. $-f(x + h)$. (3) does not
 $f(-(x + h))$. $-f(x) + k$. $f(-x + h)$. $-(f(x) + k)$. may
 $f(-x + h)$. $A(f(x) + k)$. $f(-(x + h))$. $A(f(x) + k)$.
 $-f(x + h)$. $Af(x) + k$. $f(-x) + k$. $Af(x) + k$.

13. A retail chain sells DVD players. The price-demand function of a particular model $p(x)$ (in dollars) is given below for the weekly demand x . (A) Describe how the graph of function p can be obtained from the graph of $f(x) = \sqrt{x}$. (B) Sketch a graph of function p .

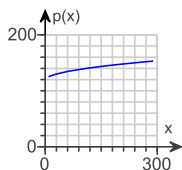
$$p(x) = 119 - 2\sqrt{x} \quad 9 \leq x \leq 289$$

How is $p(x)$ related to $f(x)$?

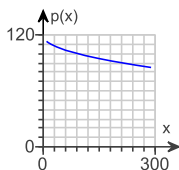
- A. The graph of $p(x)$ is the graph of $f(x)$ reflected in the x -axis, vertically shrunk by $\frac{1}{2}$, and shifted down 119 units.
 B. The graph of $p(x)$ is the graph of $f(x)$ vertically shrunk by 2 and shifted up 119 units.
 C. The graph of $p(x)$ is the graph of $f(x)$ reflected in the x -axis, vertically stretched by 2, and shifted up 119 units.
 D. The graph of $p(x)$ is the graph of $f(x)$ vertically stretched by 2 and shifted up 119 units.

Choose the correct graph of $p(x)$.

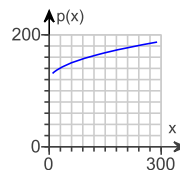
A.



B.



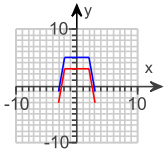
C.



1. $(-\infty, \infty)$

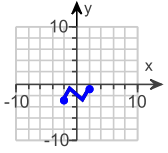
$(-\infty, 6]$

2.



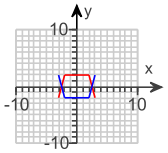
D.

3.



C.

4.



D.

5. A. Absolute value function $g(x) = |x|$

A. The graph is shifted 3 unit(s) to the left and 3 unit(s) down.

$|x + 3| - 3$

6. F. Square root function $n(x) = \sqrt{x}$

C. The graph is reflected in the x-axis and shifted 4 unit(s) down.

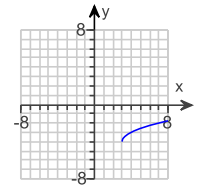
$-\sqrt{x} - 4$

7. B. Cube function $m(x) = x^3$

B. The graph is shifted 1 unit(s) to the left and 1 unit(s) down.

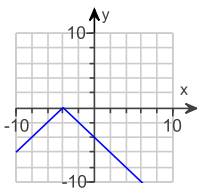
$(x + 1)^3 - 1$

8. $\sqrt{x - 3} - 4$



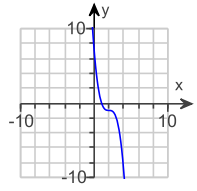
D.

9. $-|x + 4|$



D.

10. $-(x-2)^3 - 1$



C.

11. (1) $f(x+h) + k$.

(2) $f(x+h) + k$.

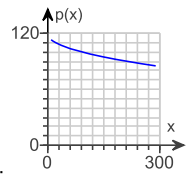
(3) does not

12. (1) $f(-(x+h))$.

(2) $f(-x+h)$.

(3) may

13. C. The graph of $p(x)$ is the graph of $f(x)$ reflected in the x -axis, vertically stretched by 2, and shifted up 119 units.



B.
