Date Completed: _____
Mentor Initials: _____

Domain and Range

1. What are all and only the values of x that are NOT in the domain of the function $f(x) = \frac{(x-4)(x+3)}{(x+5)(x-1)}$?

A. -4 and 3
B. -1 and 5
C. -5 and 1
D. $-4, -1, 3,$ and 5
E. $-5, -3, 1,$ and 4

2. Given that the function f, defined as $f(x) = 7 + 2x$, has the domain $\{-4, 1, 5\}$, what is the range of f?

A. $\{-4, 1, 5\}$
B. $\{-3, 2, 8\}$
C. $\{-2, 4, 11\}$
D. $\{-1, 9, 17\}$
E. $\{2, 12, 19\}$

3. The expression $\frac{3a+2b}{a+3c}$ is undefined whenever $a = ?$

A. $-3c$
B. $-\frac{2}{3}c$
C. 0
D. $\frac{2}{3}c$
E. $3c$

4. In the standard (x, y) coordinate plane, for what value(s) of x, if any, is there NO value of y such that (x, y) is on the graph of $y = \frac{x+7}{(x-1)(x+4)(x-5)}$?

A. $-5, -1,$ and 4 only
B. $-4, 1,$ and 5 only
C. -7 only
D. 7 only
E. There is no such value of x.

5. The graph of $y = \frac{3x+7}{x-4}$ in the standard (x, y) coordinate plane has a vertical asymptote at:

A. $x = -7$
B. $x = -4$
C. $x = \frac{7}{3}$
D. $x = 4$
E. $x = 7$

6. Two real-valued functions are defined by $f(x) = \sqrt{x} - 2$ and $g(x) = (x + 4)^3$. What is the domain of $f(g(x))$?

A. $[-4, \infty)$
B. $[-2, \infty)$
C. $[2, \infty)$
D. $[4, \infty)$
E. $(-\infty, \infty)$

7. A function is defined by $h(a) = -3a + 8$, and its domain is the set of integers from 1 through 20, inclusive. For how many values of a is $h(a)$ negative?

A. 16
B. 17
C. 18
D. 19
E. 20

8. Which of the following intervals represents all values in the domain of the function $f(x) = \log_{10}(x^2 - 2x + 1)$?

A. $(-\infty, \infty)$
B. $[0, \infty)$
C. $(-\infty, 1)$ and $(1, \infty)$
D. $(-\infty, 1]$ and $[1, \infty)$
E. $[2, \infty)$

9. If the domain of a function, f, consists of the real values of x such that $x \geq -3$, which of the following could be f?

A. $x^2 - 3$

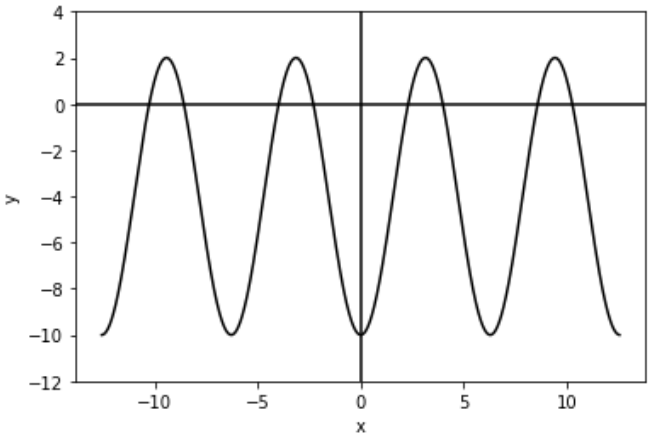
B. $\frac{x+3}{3}$

C. $\frac{x-3}{3}$

D. $\frac{x}{x+3}$

E. $\sqrt{x+3}$

10. The graph of $y = -4 + 6cos(x + \pi)$ is shown in the standard (x, y) coordinate plane below. What is the range of y?



A. $-12 \leq x \leq 4$

B. $-10 \leq x \leq 2$

C. $-5 \leq x \leq 5$

D. $-12 \leq y \leq 4$

E. $-10 \leq y \leq 2$

11. If the range of a function $f(x)$ is $[-4, 30]$, what is the range of $f(x) + 6$?

A. $[-10, 24]$

B. $[-4, 30]$

C. $[-4, 36]$

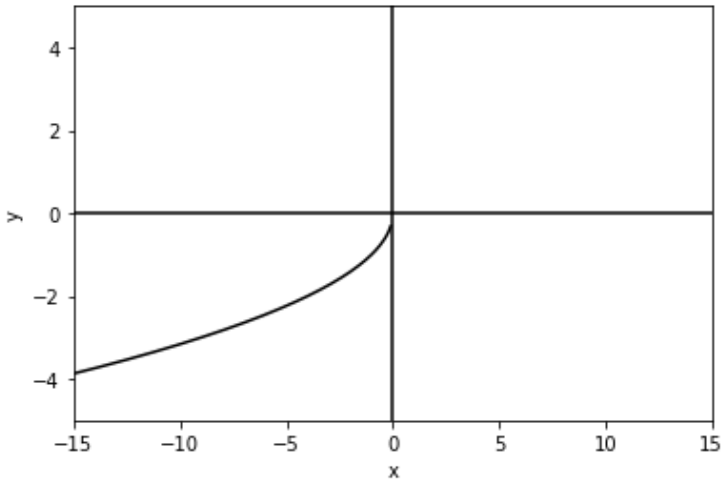
D. $[2, 36]$

E. Cannot be determined from the given information.

12. If the domain of the function $g(x)$ is $[6, \infty)$, what is the domain of $g(x-2)$?

A. $(-\infty, -6]$
B. $[4, \infty)$
C. $[6, \infty)$
D. $[8, \infty)$
E. Cannot be determined from the given information.

13. The function $h(x)$ is shown below. What is the domain of $h(x-4)$?



A. $(-\infty, -4]$
B. $(-\infty, 0]$
C. $(-\infty, 4]$
D. $[0, \infty)$
E. Cannot be determined from the given information.