Math 12 Assignment Questions, Transformations

Translations:

1. Which equation represents the graph of \( y = g(x) \) after it is translated 5 units up?
   
   A. \( y = g(x) + 5 \)
   B. \( y = g(x) - 5 \)
   C. \( y = g(x + 5) \)
   D. \( y = g(x - 5) \)

2. Which equation represents the graph of \( y = \tan x \) after it has been translated 4 units up and 7 units left?
   
   A. \( y = \tan(x + 7) + 4 \)
   B. \( y = \tan(x + 7) - 4 \)
   C. \( y = \tan(x - 7) + 4 \)
   D. \( y = \tan(x - 7) - 4 \)

3. Which equation represents the graph of \( y = g(x) \) after it is translated 3 units to the right?
   
   A. \( y = g(x) + 3 \)
   B. \( y = g(x) - 3 \)
   C. \( y = g(x + 3) \)
   D. \( y = g(x - 3) \)
Reflections:

4.
The graph of $y = f(x)$ is shown below.

Which graph represents $x = f(y)$?

A.  

B.  

C.  

D.
5. Determine an equation of the inverse of \( f(x) = 2x + 6 \).

A. \( f^{-1}(x) = \frac{1}{2} x - 3 \)

B. \( f^{-1}(x) = \frac{1}{2x + 6} \)

C. \( f^{-1}(x) = -2x - 6 \)

D. \( f^{-1}(x) = \frac{1}{2} x + \frac{1}{6} \)

6. For which of the following functions is \( f(-x) = f(x) \)?
7. Determine the inverse of the function \( f(x) = x^3 - 2 \).

A. \( f^{-1}(x) = \sqrt[3]{x} + 2 \)
B. \( f^{-1}(x) = \sqrt[3]{x} + 2 \)
C. \( f^{-1}(x) = \sqrt[3]{x} - 2 \)
D. \( f^{-1}(x) = \frac{\sqrt[3]{x}}{2} - 2 \)

**Stretches:**

8. How is the graph of \( y = f(4x) \) related to the graph of \( y = f(x) \)?

A. \( y = f(x) \) has been compressed vertically by a factor of \( \frac{1}{4} \).
B. \( y = f(x) \) has been compressed horizontally by a factor of \( \frac{1}{4} \).
C. \( y = f(x) \) has been expanded vertically by a factor of 4.
D. \( y = f(x) \) has been expanded horizontally by a factor of 4.

9. If the maximum value of the function \( y = f(x) \) is 6, determine the maximum value of \( y = \frac{1}{3} f\left(\frac{1}{2} x\right) \).

A. 2
B. 3
C. 12
D. 18

10. Which equation represents the graph of \( y = f(x) \) after it is expanded vertically by a factor of 5?

A. \( y = \frac{1}{5} f(x) \)
B. \( y = 5 f(x) \)
C. \( y = f\left(\frac{x}{5}\right) \)
D. \( y = f(5x) \)
Reciprocal and Absolute Value:

11.
If the point $(4, 6)$ is on the graph of $y = f(x)$, what point must be on the graph of $y = 3\left(\frac{1}{f(x)}\right)$?

A. $(12, \frac{1}{6})$
B. $(4, \frac{1}{18})$
C. $(4, \frac{1}{2})$
D. $(2, 18)$

Combinations:

12. (4 marks) Identify 2 coordinates on each graph.
The graph of $y = f(x)$ is shown below.
Graph: \( y = -2f(x + 3) \)

Graph: \( y = \left| f\left(\frac{x}{2}\right)\right| \)
13. 
The point \((9, -12)\) is on the graph of a function. What will the coordinates of this point be after all of the following transformations are performed on the function, in the order given?

- horizontal expansion by a factor of 3
- reflection in the \(x\)-axis
- vertical translation of 5 downward
- reflection in the line \(y = x\)

A. \((-27, 7)\)
B. \((-17, -27)\)
C. \((7, 3)\)
D. \((7, 27)\)

14. 
The graph of \(y = f(x)\) is shown below on the left. Which equation represents the graph shown on the right?

A. \(y = -2f(2x + 3)\)
B. \(y = -2f(2x + 6)\)
C. \(y = -2f\left(\frac{1}{2}x + 3\right)\)
D. \(y = -2f\left(\frac{1}{2}x + 6\right)\)
15. (4 marks) Identify 2 coordinates on each graph.

The graph of \( y = f(x) \) is shown below.

On the grid provided, sketch the graph of \( y = f(-x) - 3 \).
On the grid provided, sketch the graph of \( y = \frac{1}{f(x)} \).
The graph of $y = f(x)$ is shown below. Which graph represents $y = |f(x)| + 2$?
17. If the point \((6, 10)\) is on the graph of \(y = f(x)\), which point must be on the graph of \(y = \frac{1}{2}f(x)\)?

A. \((3, \frac{1}{10})\)
B. \((6, \frac{1}{5})\)
C. \((6, \frac{1}{10})\)
D. \((6, \frac{1}{20})\)

18. Given the graph of the function \(y = f(x)\) on the left, determine the equation of the function on the right.

\[\text{A. } y = f\left(\frac{x-3}{2}\right)\]
\[\text{B. } y = f\left(\frac{x+3}{2}\right)\]
\[\text{C. } y = f(2x-3)\]
\[\text{D. } y = f(2x-6)\]
19. (4 marks) Identify 2 coordinates on each graph.

The graph of \( y = f(x) \) is shown below.

On the grid provided, sketch the graph of \( y = 3f(x) + 1 \).
On the grid provided, sketch the graph of \( y = \frac{1}{f(x)} \).

20.
If the point \((-2, -5)\) is on the graph of \( y = f(x) \), which point must be on the graph of \( y = |f(x-1)| - 3 \)?

A. \((-3, 2)\)
B. \((-1, 2)\)
C. \((1, -8)\)
D. \((3, -8)\)
21. (4 marks) Identify 2 coordinates on each graph.

The graph of \( y = f(x) \) is shown below.

On the grid provided, sketch the graph of \( y = 2|f(x)| + 1 \).
On the grid provided, sketch the graph of \( y = \frac{1}{f(x)} \).

22.
Determine the inverse of the function \( f(x) = \frac{4x + 1}{3x} \).

A. \( f^{-1}(x) = \frac{1}{3x - 4} \)

B. \( f^{-1}(x) = \frac{-1}{3x - 4} \)

C. \( f^{-1}(x) = \frac{3x}{4x + 1} \)

D. \( f^{-1}(x) = \frac{-3x}{4x + 1} \)

23.
The \( y \)-intercept of the function \( y = f(x) \) is 5. Determine the \( y \)-intercept of \( y = -f(x) + 3 \).

A. \(-2\)
B. \(-8\)
C. \(8\)
D. \(2\)
24.

The graph of the function \( y = f(x) \) is shown below.

Which of the following is the graph of \( y = f(2x) - 3 \)?

A.  

![Graph A](image)

B.  

![Graph B](image)

C.  

![Graph C](image)

D.  

![Graph D](image)
25. If the point \((10, 6)\) is on the graph of \(y = f(x)\), what point must be on the graph of \(y = f(-2x - 4)\)?

A. \((-7, 6)\)
B. \((-9, 6)\)
C. \((-22, 6)\)
D. \((-24, 6)\)

26. The graph of \(y = f(x)\) is shown on the left. Determine an equation of the function graphed on the right.

\[ y = \frac{1}{2} f(x - 1) - 5 \]

\[ y = \frac{1}{2} f(x - 1) - 4 \]

\[ y = 2f(x - 1) - 5 \]

\[ y = 2f(x - 1) - 4 \]
27. (4 marks) Identify 2 coordinates on each graph.

The graph of $y = f(x)$ is shown below.

On the grid provided, sketch the graph of $y = 2|f(x) - 1|$.
On the grid provided, sketch the graph of \( y = \frac{1}{f(x)} \).
28.

The graph of $y = f(x)$ is shown below.

Which graph represents the graph of $y = -f(x+3)+1$?

A. 

B. 

C. 

D.
29. The graph of \( y = f(x) \) is shown below on the left. Determine an equation of the function graphed on the right.

A. \( y = -\frac{1}{2} f(x) \)
B. \( y = -\frac{1}{2} f(x) + 2 \)
C. \( y = -\frac{1}{2} f(x) + 3 \)
D. \( y = -\frac{1}{2} f(x) + 4 \)

30. If the point \((6, -12)\) is on the graph of \( y = f(x) \), which point must be on the graph of \( y = f\left( -\frac{1}{3} x + 6 \right) \)?

A. \((-36, -12)\)
B. \((-24, -12)\)
C. \((0, -12)\)
D. \((16, -12)\)