

NAME: _____ Score _____/100
 Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Questions 1 – 10 are each worth 3 points. The remaining questions are each worth 5 points.
 Circle T or F, whichever is correct.

1. T F Every function has an inverse.
2. T F To verify (prove) that two functions f and f^{-1} are inverses of each other it is necessary to show that both of the following are true:

$$(f^{-1} \circ f)(x) = f^{-1}(f(x)) = x \text{ for all } x \text{ in the domain of } f$$

$$\text{and } (f \circ f^{-1})(x) = f(f^{-1}(x)) = x \text{ for all } x \text{ in the domain of } f^{-1}$$

3. T F If the same thing is done to both sides of an equation the resulting equation is equivalent to the original equation.
4. T F $|3x - 8| > 5$ is equivalent to $-5 > 3x - 8 > 5$.
5. T F $(2, 7] = \{x \mid 2 < x < 7\}$

Fill in each of the blanks to make the statements true.

6. The _____ of a function is the set of all points whose coordinates are $(a, f(a))$ where a is an element of the domain.
7. A zero of a function f is a domain element k for which _____.

8. Absolute value is defined by _____ = $\left\{ \begin{array}{l} \text{_____} \\ \text{_____} \end{array} \right.$

9. If a horizontal line may be drawn so that it intersects the graph of a function in more than one point, then the function _____ have an inverse.

10. Write the definition of sequence.

11. Write the interval $(-2, 4]$ in set builder notation.

12. Suppose the rule for a function $f(x) = \sqrt{x^2 + 1}$. Find two functions g and h such that $f = g \circ h$. Write the rules for both g and h .

For Problems 13 – 22, Show all necessary work. NO WORK – NO CREDIT

13. What is the domain of the function whose rule is $f(x) = \frac{\sqrt{x+4}}{x-1}$

14. The rule for a function f is given by the equation $f(x) = |x - 4|$ and the rule for a function g is given by the equation $g(x) = 3x + 2$. Determine the rule for the function $f \circ g$.

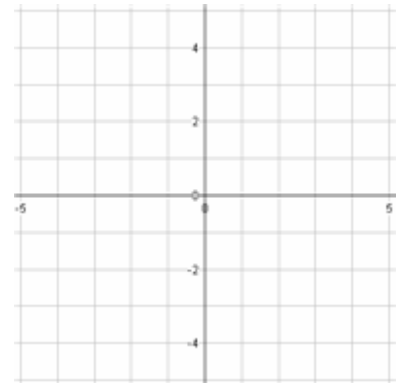
15. Suppose f and g are functions whose rules are $f(x) = x - 3$ and $g(x) = \frac{1}{x^2}$. Calculate $f \circ g(2)$

16. Suppose f and g are functions whose rules are $f(x) = 3x + 6$ and $g(x) = \frac{1}{3}x - 2$.

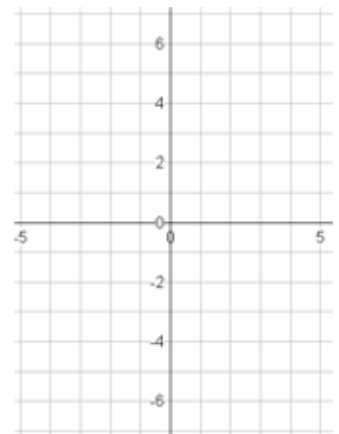
Verify (prove) that f and g are inverses of each other.

17. Find the rule (equation) for the linear function whose graph is parallel to the graph of $3x + 4y = 8$ and contains the point $(3,5)$

18. Sketch the graph of $5x - 3y = 15$. Remember to label the x and y intercepts with their coordinates



19. Sketch the graph of the function whose rule is $f(x) = 2x^2 - 5x - 3$. Label the x and y intercepts and the vertex with their coordinates. Factoring helps.



20. Solve the equation $x^2 + 8 = 4x$

21. Solve $-7x - 8 < 7$. Use interval notation to write the solution set.

22. Solve $|3x - 7| < 4$. Use interval notation to write the solution set.

Fill in the blanks

Definition: A _____ consists of three things

- A set called the _____
- A set called the _____
- A _____ which associates _____ element of the domain with a _____ element of the range.

