

NAME: _____ Score _____ /100
Please print

Circle T or F, whichever is correct. 2 pts. each for 1 – 25. 3 pts. each for all others unless otherwise noted.

1. T F A zero of a function is in the range of the function.
2. T F Absolute value equations have only positive solutions.
3. T F The graph of a linear inequality in one variable is a point on the real number line.
4. T F The sum of two functions is a function.
5. T F The product of two functions is a range element.
6. T F The Law of Trichotomy is a property of equations.
7. T F A quadratic function is a polynomial function.

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

8. If $f(3) = 8$ and $g(3) = -2$ then $(fg)(3) =$ _____.
 9. The vertex of the graph of a quadratic function f is _____.
 10. The graph of a linear function is a _____.
 11. The graph of a quadratic function is a _____.
 12. The graph of a polynomial function is a _____
_____.
 13. The solution set for $|x - 4| < 2$ is _____. (use set builder notation)
 14. The solution set for $|x - 4| > 2$ is _____. (use interval notation)
 15. The solution set for $|x - 4| = 2$ is _____. (use the roster method)
- In questions 16 - 20 be as specific as possible.**
16. The rule for a function is $f(x) = 3x - 5$. What kind of function is f ? _____.
 17. The rule for a function is $f(x) = \frac{4}{7}x^5 - 2x^3 + \sqrt{3}$. What kind of function is f ? _____.
 18. The rule for a function is $f(x) = 6x^2 - 5x + 2$. What kind of function is f ? _____.
 19. The graph of the identity function is a _____.
 20. The graph of the squaring function is a _____.

Circle all the words which could be used to correctly complete the sentence.

21. $f(x) = 2x - 7$ is the rule for a (constant linear identity quadratic squaring cubing polynomial) function.
22. $f(x) = x^2 - x - 6$ is the rule for a (constant linear identity quadratic squaring cubing polynomial) function.
23. $f(x) = x^5 - x^4 - 6$ is the rule for a (constant linear identity quadratic squaring cubing polynomial) function.
24. $f(x) = x^2$ is the rule for a (constant linear identity quadratic squaring cubing polynomial) function.
25. $f(x) = x$ is the rule for a (constant linear identity quadratic squaring cubing polynomial) function.
26. If the rules for two functions f and g are $f(x) = 4x$ and $g(x) = x^2 - x + 1$, then the rule for the product fg is $fg(x) =$
27. Write the compound inequality which does not involve absolute value and is equivalent to $|2x - 3| < 8$.
Do NOT solve.

28. Complete the statement of the Zero Factor Property.

If a and b are real numbers _____

For Problems 29 – 35 you must show your work or state reasons for your conclusions.

29. Find the rule for the linear function whose graph has slope 3 and passes through $(3, -5)$

30. What is the domain of the function whose rule is $f(x) = \frac{3x + 6}{x - 5}$

31. What are the zeros of the function whose rule is $f(x) = |3x - 5|$

32. Calculate the exact length of the line segment joining $(4, -3)$ and $(-2, 5)$.

33. Use completing the square to determine the center and radius of the circle whose equation is

$$x^2 + y^2 + 2x - 6y + 7 = 0$$

a) The center is _____ b) The radius is _____

Show your work here.

34. The rule for the function f is $f(x) = x^3 - 2x^2 + x - 5$ and the point $(2, k)$ is on the graph of f . What is the value of k ?

35. The rule for the function f is $f(x) = (x + 2)(x - 2i)(x + 2i)$. What are the x -intercepts of the graph of f .

36. Consider the graph of a function f shown in Figure 1.

a. Where is $f(x) < 0$? **Use interval notation.**

b. Where is $f(x) = 0$? **Use the roster method.**

c. Where is $f(x) > 0$? **Use interval notation.**

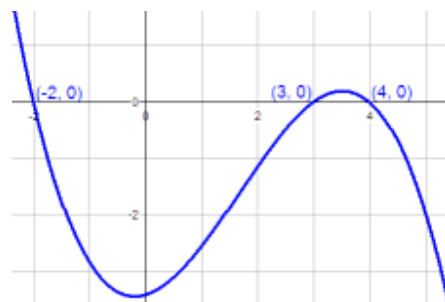


Figure 1

37. (5 points) The rule for a function f is $f(x) = -3x^5 - 22x^4 + 6x^3 - 7x^2 + 8x - 5$. Complete the following statements about f .

- a. The graph of f “tries” to cross the x -axis _____ times.
- b. The graph of f can cross the x -axis no more than _____ times.

As $x \longrightarrow +\infty, f(x) \longrightarrow$ _____

c.

As $x \longrightarrow -\infty, f(x) \longrightarrow$ _____

- d. The graph of f must cross the x -axis at least _____ times.

38. (6 pts) **Definition:** A _____ consists of three things;

A set called the _____

A set called the _____

A _____ which associates _____ element of the _____ with a _____ element of the range.

39. (4 pts)

