

Use the following set of numbers to answer 1 – 4. { (3,9), (2,4), (1,4), (0,2), (3,5) }

- 1) State the domain.    2) State the range.    3) Is it a function?    4) Discrete or continuous?

Find each value if  $g(x) = 3x^2 - 4$

- 5)  $g(15)$                       6)  $g(-5)$                       7)  $g(6n)$

Find the x & y-intercepts for each equation.

- 8)  $y + 3x = 21$                       9)  $x = 3y + 2$                       10)  $\frac{2}{3}x = \frac{1}{6}y - 3$

Write a linear equation ( $y = mx + b$ ) using the given information.

- 11) slope = -6 and y-int = 10                      12) slope = 3, passes thru (8, -1)  
13) passes thru (2, 7) and  $\perp$  to  $y = 2x - 1$                       14) passes thru (-5, 0) and (-3, 10)

Determine the slope from the equation or the given points.

- 15) slope of  $y = \frac{5}{7}x + 8$                       16) slope  $3y + 4x = 3$   
17) (6,2) & (-2,3)                      18) (4,-3) & (-3,6)                      19) (5,1) & (3,-2)

20 – 24. Name the slopes that are parallel & perpendicular to each of your answers for 15 – 19.

25) Use the inequality:

$$f(x) > -3|x - 2| + 4$$

to:

- name the type of function.
- name the vertex.
- name the axis of symmetry.
- determine the direction of opening (up or down).
- graph it!

Solve these systems of equations (use any method including the graphing calculator).

$$\begin{aligned} 26) \quad & x + y = 1 \\ & 3x + 5y = 7 \end{aligned}$$

$$\begin{aligned} 27) \quad & -2x + 5y = -14 \\ & x - y = 1 \end{aligned}$$

Simplify.

$$28) \quad 3m^3 - 18m^3n + 36m^3 - 13$$

$$29) \quad y^2(y)(y^3)$$

$$30) \quad (x^5)^5$$

$$31) \quad (2a^3b^2)^3(-3a^2c^4)(4ab^3c)$$

$$32) \quad \frac{8e^2f^7g}{20e^9f}$$

$$33) \quad \frac{36p^4q}{12p^{-6}q^7}$$

$$34) \quad 5x^3y(3x + 2y^4 - 2)$$

$$35) \quad 3a^4bc^3(2ac^5 - 4a^3b^4 + 6ab^3c^2 - 5)$$

$$36) \quad (5x - 2)(3x - 11)$$

$$37) \quad (2x + 5)(2x - 5)$$

$$38) \quad (2x - 4)^2$$

Find the degree of each polynomial.

$$39) \quad 2^3x^5y$$

$$40) \quad -5de^8f^4 + de - 18d^5e^7f + 7$$

Divide (using synthetic or long division or factor/cancel)

$$41) \quad (3x^3 - x^2 + 2x - 4) \div (x - 3)$$

$$42) \quad (x^4 - 81) \div (x - 3)$$

$$43) \quad (4x^2 - 8x + 3) \div (2x - 1)$$

Simplify the square root or complex number problems

$$44) \quad (4 - 3i) + (5i - 9)$$

$$45) \quad (18 + 5i) - (11 - 7i)$$

$$46) \quad (6 + 2i)^2$$

$$47) \quad \sqrt{-27}$$

$$48) \quad (\sqrt{21})(4\sqrt{28})$$

$$49) \quad \sqrt{\frac{19}{36}}$$

50)  $(5i^2)(-3i^7)^3$

51)  $3i(2i - 9i^2)$

52)  $i^{3,177}$

53) Use a conjugate to simplify:

$$\frac{5}{4 - 4i}$$

54) Solve the equation:  $x^2 + 17 = -1$ 

Label each function as either absolute value (A), constant (C), Greatest Integer or Step (S), Piecewise (P), or Quadratic (Q)

55)  $f(x) = 7$

56)  $f(x) = \lceil x - 5 \rceil$

57)  $f(x) = |x| - 2$

58)  $f(x) = \begin{cases} x + 1, & \text{if } x > 0 \\ x - 1, & \text{if } x \leq 0 \end{cases}$

59) Sketch an example of what each kind of function from the previous set of directions looks like.

Factor the following. Remember to try a GCF first!

60)  $15xy^2 + 30xz - 45x^2$

61)  $a^2b^2 - 144$

62)  $p^2 + 8p - 33$

63)  $12x^2 + 16x + 5$

64)  $5a^3 + 40$

65)  $jz^2 + 16jz + 64j$

66) Fill in the blank with the number that will correctly "complete the square".

$$n^2 - 11n + \underline{\hspace{2cm}}$$

67) Find the discriminant for the following quadratic equation:

$$5x^2 + 2x - 8 = 0$$

Solve the following quadratic equations. Try factoring #67, complete the square for #68, and you may choose the method for #69.

68)  $2x^2 - 9x - 35 = 0$

69)  $x^2 + 10x + 17 = 0$

70)  $4x^2 + 12x = 3$

71) Use the equation

$$y = \frac{1}{2}(x+3)^2 - 2$$

to:

- a) name the type of function.
- b) name the vertex.
- c) name the axis of symmetry
- d) determine the direction of opening (up or down).
- e) graph it!

Find the equation in vertex form [  $y = a(x - h)^2 + k$  ] for each of the following scenarios.

72) Vertex = (5, -3)  
passes thru the point (3, -9)

73) Vertex = (0, 14)  
passes thru the point (3, 20)

Solve the quadratic inequalities using “sign analysis”.

74)  $x^2 - 13x + 40 > 0$

75)  $4x^2 + 9x - 9 \leq 0$

76)  $x^2 + 14x + 49 \geq 0$