

Name: _____**Date:** _____

1) City B is located at 100 miles east and 50 miles north of city A. City C is located at 75 miles west and 150 miles south of city A. Find the distance between city B and city C. You can choose city A as the origin of the rectangular coordinate system. Write your answer rounded to two decimal places, if necessary. (5 Points)

2) Find the midpoint of the line segment whose endpoints are $(-8, 4)$ and $(-4, 8)$ (5 Points)

3) If $(3, b)$ is a point on the graph of $3x - 2y = 17$, what is b ? (5 Points)

4) Find the x and y intercepts of the following $3x^2 - 10x - 8 - y = 0$ (5 Points)

5) Give the equation of a circle that has a center at $(5, 8)$ and a radius of 7. (5 Points)

6) Find the center and radius of the circle with the given equation

$$4x^2 + 4y^2 - 24x + 16y - 20 = 0$$

(7 points)

Solve

7)

$$1 - \frac{9}{5x} = \frac{7}{3}$$

(7 points)

8) Use the quadratic formula to solve the following equation

$$4x^2 + 12x = -2$$

(5 points)

Solve:

9) $\sqrt{2x+3} - \sqrt{x+1} = 1$

(8 points)

10) A real estate agent earns a commission of 7.5% of the selling price of every house that she sells. She is currently negotiating a contract on a house she expects the final selling price to be between \$114,000 and \$119,000 inclusive. Over what range does the agent's commission vary?
(5 points)

11) Solve the following inequality $|g - 7| < 9$ (5 points)

12) Write an equation of the line passing through the point (2,1) and perpendicular to the line $y = -4x - 5$. (5 points)

13) Each month a gas station sells x gallons of gas at \$1.92 per gallon. The cost to the owner of the gas station for each gallon of gas is \$1.32, and the monthly fixed cost for running the gas station is \$37000. (10 points)

- a) Find the cost function. (Hint: Cost = Variable Cost + Fixed Cost)
- b) Find the revenue function. (Hint: Revenue = Price * Quantity)
- c) Write an equation that relates the monthly profit, in dollars, to the number of gallons of gasoline sold. (Hint: Profit = Revenue – Cost)
- d) Use the equation to find the monthly profit when 75000 gallons of gas are sold in a month.

14) A truck rental company rents a moving truck one day charging \$31 plus \$0.09 per mile. Write a linear equation that relates the cost C, in dollars, of renting the truck to the number x of the miles driven. What is the cost of renting the truck if the truck is driven 210 miles?
(10 points)

15) Find the value of $\frac{f(x+h) - f(x)}{h}$ assuming h is not zero for the function

$$f(x) = 4x^2 - 5$$

(Clearly state each of the steps of the process.)

(10 points)

16) Given $f(x) = -4x^2 + 3x + 15$ Find x such that $f(x) = -7$
(5 points)

17) Give the domain of the function.

(10 points)

a) $f(x) = 3x^2 + 2x + 5$

b) $f(x) = \sqrt{10 - x}$

c) $f(x) = \frac{(x - 7)}{(x - 6)(x - 7)}$

d) $g(x) = \frac{-5 - x}{\sqrt{-5 - x}}$

18) Find the average rate of change for the function over the given interval.

$f(x) = x^2 + x$ between $x = 6$ and $x = 8$

(10 points)

19) David has available 400 yards of fencing and wishes to enclose a rectangular area.

(10 points)

a) Express the area A of the rectangle as a function of the width x of the rectangle.

b) What is the domain of A?

20) Let $P = (x, y)$ be a point on the graph of $y = x^2 - 8$ (10 points)

a) Express the distance d from P to the origin as a function of x .

b) What is d if $x = 0$?

c) What is d if $x = 1$?

d) Use your calculator to graph $d(x)$

e) For what values of x is d smallest?

21) Write the function whose graph is the graph of $y = x^3$, but is (10 points)

a) Shifted to the right 4 units

b) Shifted up 4 units

c) Reflected about the y -axis

d) Vertically stretched by a factor of 4