

MATH106, Problem Set 2

OCT. 21, 2013

Colorado Technical University

Name _____

Instructions. Show your work for full credit. Use additional sheet if necessary. If any of the questions are not clear to you, please ask for an explanation.

1. (1 pt.) Find the point-slope form of the line with slope -2 , containing the point $(1, 3)$.
2. (1 pt.) Write an equation of the vertical line passing through the point $(-2, 6)$.
3. (2 pts.) Find the slope-intercept form of the line containing the points: $(2, -5)$ and $(7, 10)$. Next, graph the line, clearly marking both the x -intercept and the y -intercept.
4. (1 pts.) Write an equation of the line parallel to the line $y = 3x + 5$ and passing through the point $(1, 4)$

5. (1 pts.) Write an equation of the line perpendicular to the line $y = 3x + 5$ and passing through the point $(1, 4)$
6. (1 pt. each) Suppose that $f(x) = x^2 - 5x$. Calculate:
- (a) $f(3)$
- (b) $f(3 + h)$
7. (1 pt.) Write the formula for the linear function $g(x)$, whose graph crosses the x axis at 5 and the y axis at 2.
8. (1 pt.) The average cab ride in a certain city is 7.3 miles. The cost is \$3 for the first mile and \$0.20 for each additional $1/10$ of a mile. Write the formula for the cost of the cab ride function $C(x)$, where x represents the number of miles.

MATH106 Problem Set 3

OCT. 23, 2013

Colorado Technical University

Name _____

Instructions. Show your work for full credit. Use additional sheet if necessary. If any of the questions are not clear to you, please ask for an explanation.

1. (4 pts.) Given the function $f(x) = -(x + 3)^2 + 5$.

(a) (1 pt.) Find the intercepts

(b) (1 pt.) Find the vertex

$$ax + by + c = 0$$

(c) (1 pt.) Find the maximum or minimum value

(d) (1 pt.) Sketch a graph of the function $f(x)$.

2. (1 pt.) Find the vertex of the function $g(x) = 3x^2 - 5x + 7$.

$$ax + by + c = 0$$

3. (1 pts. each) Find the exact solutions of the equations:

(a) $x^2 - 5x + 4 = 0$

(b) $x^2 - 3x + 1 = 0$

4. (1 pt.) Use the square root method to solve the following quadratic equation:

$$x^2 + 6x + 9 = 25$$

Hint: notice that $x^2 + 6x + 9 = (x + 3)^2$ and use it to find the value of $x + 3$.

5. (1 pt.) Express the circumference of a circle C as a function of its area A .

6. (1 pt.) Maria, who has been a computer consultant for the past 5 years, has 100 regular customers. Her standard fee is \$90 per hour. She decided to raise her fees, and following some research and based on her previous experience, she expects that she will lose a customer for every \$1 per hour increase in cost. What should be the new hourly fee for Maria to maximize her income?

MATH106, Problem Set 4

OCT. 28, 2013

Colorado Technical University

Name _____

Instructions. Show your work for full credit. Use additional sheet if necessary. If any of the questions are not clear to you, please ask for an explanation.

1. (1 pt.) Find the intersection point of the two lines: $y = 2x + 1$ and $y = -3x + 5$. In addition to the analytical solution, graph both lines.

2. (2 pts.) Solve the system of equations by substitution or elimination:

$$\begin{cases} x - 3y = -4 \\ 2x + 5y = 25 \end{cases}$$

3. (2 pts.) Use the method of elimination to solve the system of equations:

$$\begin{cases} x - 2y = -4 \\ x + y = 17 \end{cases}$$

4. (1 pt.) Can a system of two linear equations in two variables have 3 solutions? Explain your answer geometrically in your own words.
5. (2 pts.) A pharmacist needs to make 15 ounces of a 20% alcohol solution by mixing together a 10% alcohol solution with 40% alcohol solution. How much of each solution should he use?
6. (2 pts.) Peter has a hot dog stand in the mall. He pays \$2000 per month to rent the space. Each hot dog, including the bun and all the condiments, costs him \$0.50. The price of the hot dogs for customers is \$3 each. How many hot dogs does Peter need to sell to break even? If he sells 1000 hot dogs, what will his profit be?

MATH106, Problem Set 5

Nov. 04, 2013

Colorado Technical University

Name

Emem Udo

Instructions. Show your work for full credit. Use additional sheet if necessary. If any of the questions are not clear to you, please ask for an explanation.

1. (1 pt. each) State whether each of the systems corresponding to each reduced augmented matrix has a unique solution, no solution or infinitely many solutions. If the system has solution(s), describe them parametrically.

(a)
$$\begin{bmatrix} 1 & 0 & 3 & -7 \\ 0 & 1 & 2 & 5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$
 infinite

(b)
$$\begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$
 unique

(c)
$$\begin{bmatrix} 1 & 0 & 2 & 5 \\ 0 & 1 & 1 & 3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$
 no solution

(d)
$$\begin{bmatrix} 1 & 2 & 0 & 3 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$
 infinite

2. (2 pts.) It is recommended that a person who weighs 180 lbs, making a moderate amount of exercise, should eat between 65 and 123 grams of proteins per day. A nutritionist would like to plan a meal with 55 grams of proteins and 400 calories. Assuming that kidney beans have 1 gram of proteins and 8 calories per ounce serving and if fried chicken has 5 grams of proteins and 35 calories per ounce. How many ounces of kidney beans and chicken should be used?

3. (2 pts.) Paula has \$12,000 to invest. She would like to invest in three separate accounts, paying 3%, 4% and 7% per year, respectively. She would like the combined amount invested at 3% and 4% to be twice the amount invested at 7%. How much should Paula invest in each account in order to earn \$550 per year?

4. (2 pts.) Use the method of Gauss or Gauss-Jordan elimination to solve the system of equations:

$$\begin{cases} 3x - 3y - z = 4 \\ x + 2y - z = -8 \\ 2x + y - 2z = -10 \end{cases}$$