

MATH 120 Practice Test 2

Slope-Intercept Form	Point-Slope Form	Slope Formula
$y = mx + b$	$y - y_1 = m(x - x_1)$	$m = \frac{y_2 - y_1}{x_2 - x_1}$

1. A car rental agency charges \$175 per week plus \$0.30 per mile to rent a car.

 - a) Write an equation that expresses the weekly cost to rent the car, y , in terms of the number of miles driven during the week, x .

 - b) How many miles did you drive during the week if the weekly cost to rent the car was \$325?

2. A plant can manufacture 20 golf clubs per day at a total daily cost of \$5000 and 70 golf clubs per day for a total cost of \$6500.

 - a) Assuming that daily cost and production are linearly related, find the total daily cost, C , of producing x golf clubs.

 - b) Graph the total daily cost for $0 \leq x \leq 200$.

 - c) Interpret the slope and y intercept of the cost equation.

3. The manager of a restaurant found that the cost to produce 100 cups of coffee is \$125, while the cost to produce 500 cups is \$325. Assume the relationship between the cost y to produce x cups of coffee is linear.

a) Write a linear equation that expresses the cost, y , in terms of the number of cups of coffee, x .

b) How many cups of coffee are produced if the cost of production is \$420?

4. A farmer buys a new tractor for \$150,000 and assumes that it will have a trade-in value of \$80,000 after 14 years. The farmer uses a constant rate of depreciation to determine the annual value of the tractor.

a) Find a linear model for the depreciated value V of the tractor t years after it was purchased.

b) What is the depreciated value of the tractor after 6 years?

c) When will the depreciated value fall below \$40,000?

d) Graph V for $0 \leq t \leq 20$.

5. Animals in an experiment are to be kept under a strict diet. Each animal should receive 63 grams of protein and 14.5 grams of fat. The laboratory technician is able to purchase two food mixes: Mix A has 30% protein and 5% fat. Mix B has 40% protein and 10% fat. Complete the chart. Write and solve a system of equations to determine how many grams of each mix should be used to obtain the right diet for one animal?

	Grams of Mix A	Grams of Mix B	Total
Protein			
Fat			

6. A company produces lawn mowers. The company's daily fixed costs are \$40,000 and variable costs are \$2000 per lawn mower. The mowers are sold for \$2200 each.

a. Find the cost function $C(x)$.

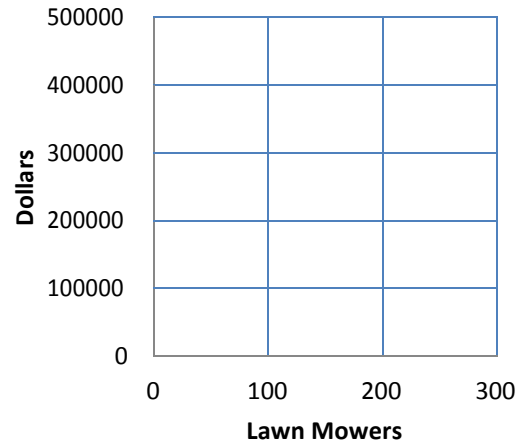
b. Find the revenue function $R(x)$.

c. Find the break-even point. Write your answer as an ordered pair.

d. Graph the cost and revenue functions

on the given coordinate system and show the break-even point.

e. Write the meaning of the break-even point you found in part c using complete sentences with correct units. Include an interpretation of the regions between the lines that are to the left and to the right of the break-even point.



7. A company markets exercise DVDs that sell for \$29.00, including shipping and handling. The monthly fixed costs (advertising, rent, etc.) are \$45,000 and the variable costs (materials, shipping, etc.) are \$14.00 per DVD.

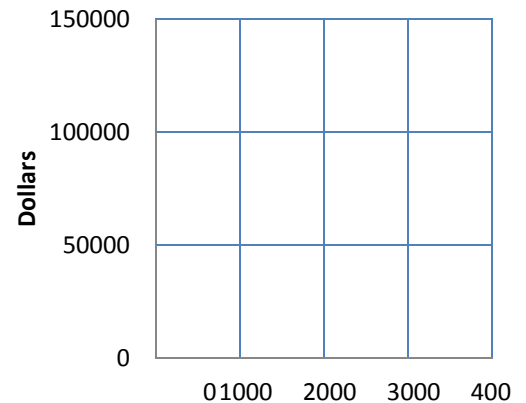
a. Find the cost function $C(x)$.

b. Find the revenue function $R(x)$.

c. Find the break-even point. Write your answer as an ordered pair.

d. Graph the cost and revenue functions on the given coordinate system and show the break-even point.

e. Write the meaning of the break-even point you found in part c using complete sentences with correct units. Include an interpretation of the regions between the lines that are to the left and to the right of the break-even point.



8. A fruit grower uses two types of fertilizer in an orange grove, brand A and brand B. Each bag of brand A contains 10 pounds of nitrogen and 6 pounds of phosphoric acid. Each bag of brand B contains 12 pounds of nitrogen and 8 pounds of phosphoric acid. The orange grove needs 11600 pounds of nitrogen and 7600 pounds of phosphoric acid. How many bags of each brand should be used to meet these requirements?

9. A small manufacturing plant makes three types of inflatable boats: one-person, two-person, and four-person models. Each boat requires the services of three departments, as listed in the table. The cutting, assembly and packaging departments have available a maximum of 350, 330 and 115 labor-hours per week respectively. How many boats of each type must be produced each week for the plant to operate at full capacity?

Department	One-Person	Two-	Four-	
Cutting	0.5 hr	1.0 hr	1.5 hr	
Assembly	0.6 hr	0.9 hr	1.2 hr	
Packaging	0.2 hr	0.3 hr	0.5 hr	

10. A dietitian in a hospital is to arrange a special diet composed of three basic foods. The diet is to include exactly 400 units of calcium, 160 units of iron, and 240 units of vitamin A. The number of units per ounce of each nutrient contained in each of the foods is indicated in the table. How many ounces of each food must be used to meet the dietary requirements?

Nutrient	Food A Units per	Food B Units per	Food C Units per	
Calcium	30	10	20	
Iron	10	10	20	
Vitamin A	10	30	20	

11. An outdoor amphitheater has 25,000 seats. Ticket prices are \$8, \$12 and \$20, and the number of \$8 tickets sold must equal the number of \$12 tickets sold. How many of each type of ticket must be sold in order to have a return of \$400,000?

12. A farmer wants to use two brands of fertilizer for his corn crop. Brand A contains 18% nitrogen and 5% phosphate. Brand B contains 15% nitrogen and 9% phosphate. How many pounds of each brand of fertilizer should be used if the farmer's corn crop needs 40.5 pounds of nitrogen and 18.5 pounds of phosphate?

13. An automobile dealer sold 3600 sedans and 3240 minivans last year. For this dealer, Plant A produces 15 sedans and 9 minivans per week and Plant B produces 10 sedans and 12 minivans per week. How many weeks did each plant operate in order to produce the 3600 sedans and 3240 minivans sold by the dealer?

14. Use the following matrix to answer the following questions. $A = \begin{bmatrix} -8 & 3 \\ 1 & 2 \end{bmatrix}$

a) Find $3A$

b) $R_1 \leftrightarrow R_2$

c) $8R_1 + R_2 \rightarrow R_2$

Given the following Matrices:

$$A = \begin{bmatrix} -8 & 3 \\ 1 & 2 \end{bmatrix}$$

$$B = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

d) Find the product AB

e) Find 3 times matrix B, namely: $3B$