

College Name: _____

Seat No: _____ Student's Name: _____

Copy No: _____

KARACHI UNIVERSITY BUSINESS SCHOOL
UNIVERSITY OF KARACHI
FINAL EXAMINATION DECEMBER 2017; AFFILIATED COLLEGES
BASIC MATHEMATICS; BA (H)-321
BS – I

Date: December 26, 2017

Max Time: 3 Hrs
Max Marks: 60

INSTRUCTIONS:

1. Attempt all questions.
2. Do not write anything on the question paper. **EXCEPT** the initials mentioned above.
3. Mobile phones or any other communicating device will not be allowed in the examination room. Students will have to remove the batteries of these devices before entering the examination hall.

Q1: Do the following: [12]

- a) Evaluate: $\frac{3^{-3}}{4^{-2}}$
- b) Multiply $(-4x - 6)(2x^2 - 5x - 6)$
- c) Solve the inequality: $3 - 3x \geq 19 - x$
- d) Write in lowest terms: $\frac{6x^2 + 8x - 8}{6x^2 - 28x + 16}$

Q2: Automobile Leasing A car-leasing agency purchases new cars each year for use in the agency. The cars cost \$15,000 new. They are used for 3 years, after which they are sold for \$3,600. The owner of the agency estimates that the variable costs of operating the cars, exclusive of gasoline, are \$0.16 per mile. Cars are leased at a flat rate of \$0.33 per mile (gasoline not included). [12]

- (a) What is the break-even mileage for the 3-year period?
- (b) What are total revenue, total cost, and total profit for the 3-year period if a car is leased for 50,000 miles?
- (c) What price per mile must be charged in order to break even if a car is leased for 50,000 mile over a period of 3 years?
- (d) What price per mile must be charged in order to earn a profit of \$5,000 per car over its 3-year lifetime if it is leased for a total of 50,000 miles?

Q3: A firm produces three products which sell, respectively, for \$25, \$35, and \$ 50. Labor requirements for each product are, respectively, 3.0, 4.0, and 3.5 hours per unit. Assume labor costs are \$5 per hour and annual fixed costs are \$75,000. [12]

- (a) Construct a joint total revenue function for the sale of the three products.
- (b) Determine an annual total cost function for production of the three products.
- (c) Determine the profit function for the three products. Is there anything usual about this function?
- (d) What is annual profit if 20,000, 10,000, and 30,000 units are sold, respectively, of three products?

Q4: Determine the slope-intercept form of the linear equation which passes through $(-2, 8)$ and is parallel to $-4x + 8y = 20$. [05]

Q5: HMO Popularity A health maintenance organization (HMO) provides health care to individuals and families on a prepaid basis. Typically, the subscriber pays an insurance premium for which most health care services are provided. These organizations typically emphasize preventive health care, and subscribers usually do not pay for office visits. A survey indicates that this type of insurance plan is being selected by more individuals. In 1980 there were 24 million individuals covered by these types of plans. In 1985 the number was 28.4 million. If the growth is assumed to be occurring at a linear rate: [05]

- (a) Determine the estimating function $n = f(t)$, where n equals the number of individuals covered by HMO plans and t equals time measured in years ($t = 0$ for 1980).
- (b) What is the number of individuals covered by HMOs expected to be in the year 2000?

Q6: Reena took a loan of 1200 with simple interest for as many years as the rate of interest. If she paid 432 as interest at the end of the loan period, what was the rate of interest? [04]

Q7: If $2\begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, find the values of x and y . [10]

END OF EXAM PAPER