King Fahd University of Petroleum & Minerals
Department of Math and Stat
Math 131 Semester 162 - Final Exam

Name_____ ID No._____

1) An Educational Services Company offers a course to thirty persons at a charge of $50 each. Moreover, the company will agree to reduce the charge for *everybody* by $1.00 for each person over the thirty who attends, up to a total group size of fifty. It has been determined that the greatest revenue the company can receive is $1600. What group size will give this revenue? 1) _____

A) 34 B) 36 C) 40 D) 44 E) 48

2) A company will manufacture a total of 5000 units of its product at plants A and B. At plan A the unit cost for labor and material combined is $2.50, while at plant B it is $3.00. The fixed costs at plant A are $6000 and at plant B they are $8000. Between the two plants the company has decided to allot no more than $28,000 for total costs. The minimum number of units that must be produced at plant A is 2) _____

A) 2000. B) 1871. C) 2500. D) 2545. E) 2546.

3) The demand function for an appliance company's line of washing machines is $p = 300 - 5q$, where p is the price (in dollars) per unit when q units are demanded (per week) by consumers. Find the manufacturer's maximum total revenue. 3) _____

A) $3000 B) $3500 C) $4000 D) $4500 E) $5000

4) Find the price, p, at equilibrium for a product with Demand Equation and Supply Equation as follows: 4) _____

Demand: $p = 300 - 8q$

Supply: $p = \frac{19}{5}q + 5$

A) $95 B) $100 C) $105 D) $110 E) $120

5) For an initial investment of $10,000, suppose a company guarantees the following cash flows at the end of the indicated years: 5) _____

Year	Cash Flow
1	$4000
3	$8000

Assume an interest rate of 5% compounded annually. Determine the net present value of the cash flows.

A) $1065.76 B) $884.35 C) $1074.4 D) $538.82 E) $720.23

6) If an investment of $20,000 earns interest at an annual rate of 9% compounded continuously, then the value (in dollars) of the investment six years from now is 6) _____

A) $11655.0 B) $34320.1 C) $13755.4 D) $21287.4 E) $30314.3

7) Suppose $500 is initially placed in a savings account that earns interest at the rate of 8% compounded semiannually. Thereafter, $500 is deposited in the account at the end of every six months for five years. The value of the account at the end of five years is 7) _____

A) $6003.05. B) $6743.18. C) $6799.78. D) $4555.45. E) $4055.45.

8) Consider the following annuity: $2000 due at the end of each year for 6 years, and $3000 due thereafter at the end of each year for 5 years. At an interest rate of 4% compounded annually, the present value of the annuity is 8) _____

A) $15,797.2 B) $21,039.3 C) $36,765.7 D) $9,583.28 E) $31,523.6

9) A manufacturer produces two products, product A and product B. Both products require processing on Machines I and II. The number of hours needed to produce one unit is given by the following chart: 9) _____

	Machine I	Machine II
Product A	2 hrs	3 hrs
Product B	1 hrs	4 hrs

Machine I is available for at most 1000 hours and Machine II is available for at most 2500 hours. If the profit made on product A is $20 / unit and the profit made on product B is $25 / unit. Find the maximum profit.

A) $16,000 B) $18,000 C) $10,000 D) $15,625 E) $21,230

10) Given the initial simplex tableau below, find the maximum value of Z. 10) _____

	x_1	x_2	s_1	s_2	Z	
s_1	-1	2	1	0	0	8
s_2	10	6	0	1	0	12
Z	-3	-8	0	0	1	0

A) 8 B) 18 C) 24 D) 10 E) 16

11) A club has ten members. In how many ways can the offices of president, vice president, secretary, and treasurer be filled if no member can serve in two offices? 11) _____

A) 210 B) 10,000 C) 16 D) 5040 E) 40

12) Two fair dice are rolled. What is the probability that the sum of the dots appearing is 7? 12) _____

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) $\frac{1}{36}$ D) $\frac{1}{6}$ E) $\frac{5}{6}$

13) If the odds in favor of an event E are 2:7, find $P(E')$. 13) _____

A) $\frac{2}{9}$ B) $\frac{3}{5}$ C) $\frac{7}{9}$ D) $\frac{2}{7}$ E) $\frac{5}{7}$

14) Urn I contains two red and three white marbles, and Urn II contains three red and four white marbles. A marble is randomly drawn from Urn I and placed into Urn II. A marble is then randomly drawn from Urn II. Find the probability that it is red. 14) _____

A) $\frac{17}{40}$ B) $\frac{5}{8}$ C) $\frac{9}{40}$ D) $\frac{23}{40}$ E) $\frac{3}{8}$

15) In a survey, it was found that 40% like Orange Juice, 25% liked Apple Juice, and 10% liked both. If a person in the survey is randomly selected, find the probability that the person liked Apple Juice, given that he or she liked Orange Juice. 15) _____

A) $\frac{2}{5}$ B) $\frac{1}{10}$ C) $\frac{3}{20}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

16) The mode and the median of the following set, respectively, are 16) _____

7, 9, 1, 2, 7, 9, 5, 8, 7, 3, 4

A) 9,6 B) 6,7 C) 7,9 D) 9,7 E) 7,6

17) A random variable X has a distribution given by $f(0) = 0.4$, $f(1) = 0.3$, $f(2) = 0.3$. The variance of X is 17) _____

A) 0.32. B) 0.54. C) 0.69. D) 0.47. E) 0.50.

18) A biased coin is tossed 8 times. If the probability of heads appearing on any toss is $\frac{1}{3}$, then the probability that exactly six heads appear is 18) _____

A) $\frac{2}{3^8}$. B) $\frac{100}{3^8}$. C) $\frac{56}{3^8}$. D) $\frac{224}{3^8}$. E) $\frac{112}{3^8}$.

19) Suppose X is normally distributed with mean 80 and standard deviation 15. Determine $P(65 < X < 95)$. 19) _____

A) 0.50
B) 0.997
C) 0.68
D) 0.33
E) 0.95

20) If X is normally distributed with $\mu = 20$ and $\sigma = 5$, find x_0 such that $P(X > x_0) = 0.2877$. 20) _____

A) 27.2 B) 22.8 C) 21.96 D) 31.6 E) 18.6