King Fahd University of Petroleum and Minerals
Deapartment of Mathematics and Statistics
Math 131, Major Exam II Duration 2 h

Name:..... ID Number:.....

Provide all the details including the formulas used!

Exercise 1 *Set up the simplex tableau for the following*

$$\begin{aligned} \max\ Z &= 2x_1 + 3x_2 + 4x_3 \\ & \textit{subject to} \begin{cases} x_1 + 2x_2 + x_3 \leq 10 \\ 3x_1 + x_2 + 5x_3 \leq 20 \\ 4x_1 + 3x_2 + x_3 \leq 5 \\ x_1, x_2, x_3 \geq 0 \end{cases} \end{aligned}$$

Exercise 2 *The simplex method was used to solve a standard maximization problem and the following table was obtained*

B	x_1	x_2	x_3	s_1	s_2	Z	R
x_2	0.5	1	0	0.5	0	0	5
x_1	1	0	1	-1	1	0	0
Z	0.5	0	0	0.5	0.75	1	20

at some step. Find the next step and obtain the optimum solution.

Exercise 3 *If the simplex table in the previous exercise was obtained in the process of solving a minimization problem using the simplex method applied to the dual, what would be the solution of the original problem (that is the minimization problem) ?*

Exercise 4 *What effective rate is equivalent to a nominal rate of 6% compounded (a) monthly, (b) semiannually ?*

Exercise 5 *To what amount will $50000 accummulate in 10 years if it is invested at an effective rate of 4% ?*

Exercise 6 *Which investment is better (a) 7% compounded monthly or (b) 8% compounded quarterly?*

Exercise 7 *Find the present value of $50000 due after 5 years if the interest rate is 8.5% compounded monthly?*

Exercise 8 *$30000 is deposited in a savings account that earns interest at an annual rate of 3.5 % compounded continuously, what is the value of the account at the end of three years?*

Exercise 9 *Find the amount of an annuity consisting of payments of $100 at the end of each month for two years at the rate of 7% compounded quarterly.*

Exercise 10 *A young man wishes to have \$200000 in his retirement account. Its current value is \$20000. He invests \$500 monthly in the account which earns 8.7% annually. Find the number of payments needed to reach his goal*

Exercise 11 *A die is rolled three times and the outcome of each roll is noted. How many results are possible?*

Exercise 12 *A coin is tossed 5 times. How many results are possible if the order of the tosses is considered ?*

Exercise 13 *How many six letters words from the letters in the word AUCTION are possible if no letter is repeated ?*

Exercise 14 *How many distinguishable permutations of the letters are possible in the word PLEASE ?*