KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

MATH 105: Finite Mathematics

Semester 181

Major Exam Two

Wednesday, November 7, 2018

Allowed time 90 minutes

Name: ID#: Serial#:

Directions:

- You are allowed to use electronic calculators and other reasonable writing accessories that help write the exam.
- Do not keep your mobile with you during the exam, turn off your mobile and leave it aside.

Question No	Full Marks	Marks Obtained
1	1	
2	1	
3	1	
4	1	
5	1	
6	1	
7	1	
8	1	
9	1	
10	1	
Total	10	

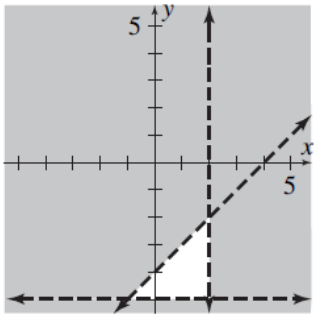
1. The graphical solution of the following inequalities is

$2x-3y\rangle -12$

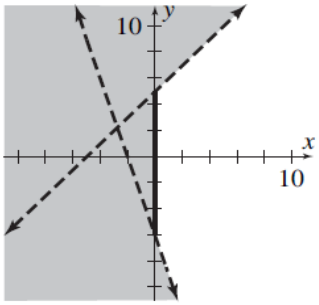
$3x+y\rangle -6$

$y\rangle x$

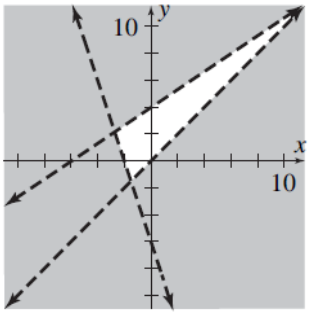
a.



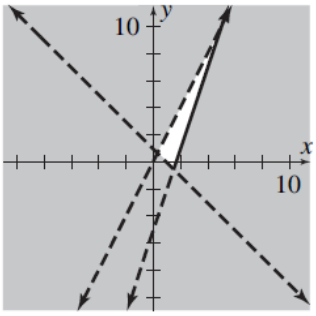
b.



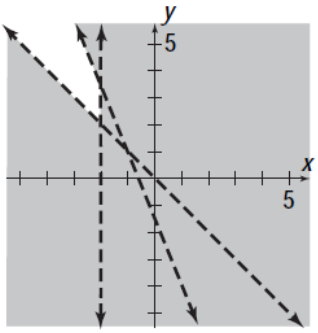
c.



d.



e.



2. A produce grower is purchasing fertilizer containing three nutrients: A, B, and C .The minimum weekly requirements are 80 units of A, 120 of B, and 240 of C .There are two popular blends of fertilizer on the market. Blend I, costing $8 a bag, contains 2 units of A, 6 of B, and 4 of C. Blend II, costing $10 a bag, contains 2 units of A, 2 of B, and 12 of C. How many bags of each blend should the grower buy each week to minimize the cost of meeting the nutrient requirements? (Use graphical method).

a. To minimize the cost the grower should buy 10 bags of Blend I and 30 bags of Blend II.
b. To minimize the cost the grower should buy 20 bags of Blend I and 10 bags of Blend II.
c. To minimize the cost the grower should buy 10 bags of Blend I and 20 bags of Blend II.
d. To minimize the cost the grower should buy 20 bags of Blend I and 15 bags of Blend II.
e. To minimize the cost the grower should buy 30 bags of Blend I and 10 bags of Blend II.

3. In order to Maximize: $W = x_1 - 12x_2 + 4x_3$

Subject to

$$4x_1 + 3x_2 - x_3 \leq 1$$
$$x_1 + x_2 - x_3 \geq -2$$
$$-x_1 + x_2 + x_3 \geq -1$$
$$x_1, x_2, x_3 \geq 0$$

a. In the second simplex table the Pivot element is -3
b. In the second simplex table the Pivot element is -1
c. In the second simplex table the Pivot element is 2
d. In the second simplex table the Pivot element is 3
e. In the second simplex table the Pivot element is 1

4. Solve by using dual and the simplex method

Minimize $Z = 2x_1 + 2x_2$

Subject to

$$x_1 + 4x_2 \geq 28$$
$$2x_1 - x_2 \geq 2$$
$$-3x_1 + 8x_2 \geq 16$$
$$x_1, x_2 \geq 0$$

a. The minimum Z = 20 when $x_1 = 6, x_2 = 4$

b. The minimum Z = 20 when $x_1 = 4, x_2 = 6$

c. The minimum Z = 14 when $x_1 = \frac{3}{2}, x_2 = \frac{1}{2}$

d. The minimum Z = 20 when $x_1 = \frac{2}{3}, x_2 = \frac{1}{2}$

e. The minimum Z = 14 when $x_1 = 6, x_2 = 4$

5. To what sum will $1000 accumulate if it is invested at 10% compounded annually for one year and then at 10% compounded semiannually for two years?

a. $1610.51 b. $1464.10 c. $1100.00 d. $1215.51 e. $1337.06

6. If an initial investment of $4000 grows to $4884 in five years, find the nominal rate of interest, compounded monthly, that was earned by the money.

a. 3.33% b. 2.02% c. 4.07% d. 3.96% e. 1.68%

7. An investment grows from $600 to $642 in one year. If the investment continues to grow at that rate, find the number of years it will take for the investment to double.

a. 9.9 years b. 8.56 years c. 10.24 years d. 12.43 years e. 7.5 years

8. At an annual rate of 10% compounded continuously, the number of years in which a principal triples is

a. $\frac{\ln 3}{0.10}$ *b.* $\frac{0.10}{\ln 3}$ *c.* $\frac{3}{\ln 0.10}$ *d.* $e^{0.30}$ *e.* $\frac{\ln 0.10}{3}$

9. Suppose a person deposits $1000 in a savings account at the end of every six months. What is the value of the account at the end of five years if interest is at a rate of 10% compounded semiannually?

a. $15937.42 b. $12577.89 c. $13450.74 d. $1628.89 e. $5525.63

10. Suppose a truck costing $36,000 is to be replaced at the end of 10 years, at which time it will have a salvage value of $12,000. In order to provide money at the time for a new truck costing $40,000, a sinking fund is set up into which equal payments are placed at the end of every six months. If the fund earns 6% compounded semiannually, what should each payment be?

a. $1556.26 b. $1289.84 c. $980.75 d. $1042.04 e. $1602.35