ASSIGNMENT 2 (COMPULSORY)

Due Date	Unique Number
23 March 2018	680827

Submit your answers online through myUnisa. No extensions will be granted for submission of this assignment. ***NO*** *manual or posted submissions will be allowed.*

Questions 1 and 2 are based on the information below:

An energy company in the West Coast District Municipality charges residential customers a basic fee of R150.00, and R0.50c per kilowatt hour (kWh).

Question 1

Define the utility function $y(x)$ for a household in this municipality. Let x represent the total number of kWh consumed per household.

1) $y(x) = 150x + 0.5$
2) $y(x) = 0.5x + 75$
3) $y(x) = 75x + 0.5$
4) $y(x) = 0.5x + 150$

Question 2

If there are 700 000 households in this municipality, find the revenue function $R(x)$, in rands, for the municipality. Let x be the total kWh consumed by all households.

1) $R(x) = 350\,000x + 105\,000\,000$
2) $R(x) = 150\,000x + 700\,000$
3) $R(x) = 0.5x + 105\,000\,000$
4) $R(x) = 0.5x + 700\,000$

Questions 3 to 5 are based on the information below:

Andrea Publishers is a book publisher based in Johannesburg. The total cost (in rands) of producing x high school maths study guides is given by the function:

$$C(x) = 89.9x + 120\,000$$

Question 3

What are the fixed costs for Andrea Publishers in producing the maths study guides?

1) R10 788.00
2) R1 334.82
3) R10 788 000.00
4) R120 000.00

Question 4

What is the total cost of producing 1000 study guides?

1) R100 688.00
2) R209 900.00
3) R89 900.00
4) R9 324.82

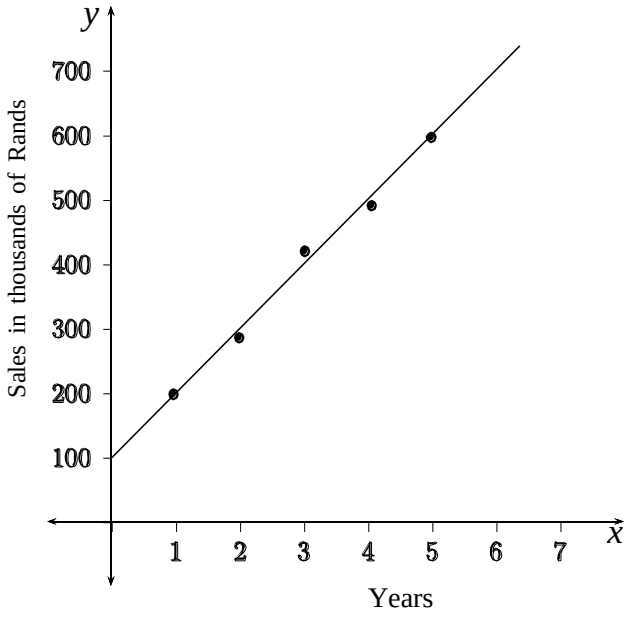
Question 5

What is the average cost per book when producing 1000 books?

1) R89.90
2) R92.34
3) R209.90
4) R100.69

Questions 6 and 7 are based on the information below:

For the past five years, Thabo and Eric run a local iKota take-away restaurant in their township. They plotted the restaurant sales vs time since they started their operation. They found that the plotted points lie approximately along a straight line. This is shown by the figure below:



Question 6

Using the points corresponding to the first and fifth year, find the equation of the sales trend line.

1) $y = 200x + 100$
2) $y = 2x + 100$
3) $y = 100x + 100$
4) $y = x + 100$

Questions 7

Using the sales trend line, what sales figures can be expected for the sixth year?

1) R1 300 000
2) R700 000
3) R112 000
4) R106 000

Question 8 and 9 are based on the following information:

The annual sales (in billions of rand) of notebooks from 2006 to 2012 are shown in the following table. (x=0 corresponds to the year 2006)

Year, x	0	1	2	3	4	5	6
Annual Sales	7.9	9.6	11.5	13.3	15.2	17	18.8

Question 8

Derive the equation ($L = y(x)$) of the line through the points corresponding to the years 2006 and 2012.

1) $y = 1.82x + 7.9$
2) $y = 1.96x + 7.9$
3) $y = 1.85x + 7.9$
4) $y = 1.84x + 7.9$

Question 9

Use the equation of the line L to estimate annual sales of notebooks in the year 2011.

1) R15.2 billion
2) R17 billion
3) R18.8 billion
4) R7.9 billion

Question 10

Which of the following statement is incorrect about the parabola: $y = ax^2 + bx + c$

1) If $|a| > 1$, the parabola appears narrow than the graph of $y = x^2$
2) The parabola is symmetric about the x-axis.
3) The highest point of a downward opening parabola is called the vertex.
4) If $a < 0$, the parabola opens downwards.

Questions 11 to 13 are based on the information below:

Consider the function: $y(x) = 2(x - 3)^2 + 1$*, and its graph.*

Question 11

Which of the following points are NOT on the graph?

1) (7;33)
2) (3;1)
3) (0;19)
4) (1;5)

Question 12

Find the x-intercept of this graph.

1) There are no x-intercept.
2) (0; 1) and (0; 3)
3) (0; -1) and (0; 2)
4) (0; -3) and (0; 1)

Question 13

Find the vertex of the graph.

1) (-1; 3)
2) (3; 1)
3) (-1; 3)
4) (3; -1)

Question 14

The estimated monthly profit (in rands) realizable by the Masai Company for manufacturing and selling x units of the Shuka Cloth is:

$$P(x) = -0.04x^2 + 240x - 1000$$

In order to maximize profits, how many units should the company produce and sell?

1) 1000 units
2) 2000 units
3) 3000 units
4) 4000 units

Questions 15 and 16 are based on the information below:

A travel agency charges R300 per person for a luxury train trip, if exactly 200 people sign up for the trip, then each fare is reduced by R1 of each additional person. Let x denote the number of passengers above 200.

Question 15

Define the revenue function R(x) for the revenue for the travel agency, where R is given in rands.

1) $R(x) = -x^2 + 60x + 100\,000$
2) $R(x) = x^2 - 60x + 100\,000$
3) $R(x) = -x^2 + 100x + 60\,000$
4) $R(x) = x^2 - 60x + 60\,000$

Question 16

How many sign-ups will help the travel agency realize their maximum profit?

1) 300 sign-ups
2) 250 sign-ups
3) 200 sign-ups
4) 350 sign-ups

Question 17

Consider the graph of the function $y = a^x, when\ x > 1$. Which of the following statement is incorrect about the graph?

1) The y-intercept is 1.
2) The graph climbs steeply to the right.
3) The graph cuts the negative $x - axis$.
4) The larger the base, a, the more steeply the graph rises to the right.

Question 18

Consider the graph of the function $y = a^x$, when $0 < a < 1$. Which of the following statement is incorrect about the graph?

1) The graph climbs steeply to the right.
2) The $y - intercept$ is 1.
3) The graph does not cut the positive $x - axis$.
4) The smaller the base, a, the more steeply the graph falls to the right.

Question 19

Solve the following system of equations:

$$\begin{aligned} 3x - 2y &= 4 \\ -6x + 4y &= 7 \end{aligned}$$

1) $x = 2 \; and \; y = 1$
2) $x = -4 \; and \; y = 3$
3) $x = 1 \; and \; y = -2$
4) $No \; solutions$

Question 20

A shop sells bicycles and tricycles. In total, there are 7 cycles (this includes both bicycles and tricycles) and 19 wheels. Determine how many of each there are, if a bicycle has two wheels and a tricycle has three wheels.

1) 4 tricycles and 3 bicycles.
2) 2 tricycles and 5 bicycles.
3) 5 tricycles and 2 bicycles.
4) 6 tricycles and 1 bicycles.

Question 21

A fruit juice costs R2.00 more than a milkshake. If 3 fruit juices and 5 milkshakes cost R78.00, determine the individual prices.

1) One milkshake is R9.00 and one fruit juice is R11.00.
2) One milkshake is R8.00 and one fruit juice is R10.00.
3) One milkshake is R12.00 and one fruit juice is R13.00.
4) One milkshake is R10.00 and one fruit juice is R12.00.

Question 22

George has 1 litre of a mixture containing 69% salt concentration. How much water must George add to make the mixture 50% salt concentration?

1) 690ml
2) 380ml
3) 500ml
4) 1000ml

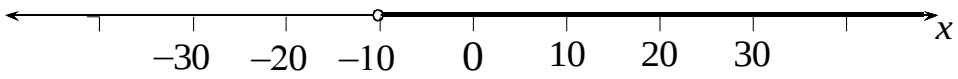
Question 23

Which one of the following inequalities best describes the number line?

1) $3 < x \leq 6$
2) $3 \leq x \leq 6$
3) $3 < x < 6$
4) $3 \leq x < 6$

Question 24

Which of the following inequalities best describes the number line?



1) $x \geq -10$
2) $x > -10$
3) $x \leq -10$
4) $x < -10$

Question 25

A doctor advises a client who is suffering from iron and vitamin B deficiency to take at least 2400 milligrams (mg) of iron, 2100mg of vitamin B_1 and 1500mg of vitamin B_2 over a period of time. Two vitamin pills are suitable, band A and brand B. Each band A pill consists of 40mg of iron, 10mg of vitamin B_1 and 5mg of vitamin B_2. Each of brand B pill consists of 10mg of iron, 15mg of vitamin B_1, and 15mg of vitamin B_2. Let x represent the number of brand A pills and y represent the number of brand B pills. Which one of the following systems of linear in equalities best represents the constraints given by this situation?

1) $40x + 10y \geq 2400;\ 15x + 10y \geq 1500;\ 15x + 5y \geq 2100;\ x \geq 0;\ y \geq 0.$
2) $10x + 40y \geq 2100;\ 10x + 15y \geq 2400;\ 5x + 15y \geq 1500;\ x \geq 0;\ y \geq 0.$
3) $10x + 40y \geq 2400;\ 15x + 10y \geq 2100;\ 15x + 5y \geq 1500;\ x \geq 0;\ y \geq 0.$
4) $40x + 10y \geq 2400;\ 10x + 15y \geq 2100;\ 5x + 15y \geq 1500;\ x \geq 0;\ y \geq 0.$