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**University Examinations 2014/2015**

FIRST YEAR, FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN BRIDGING MATHEMATICS

**SMB 0105: GRAPHS**

**DATE: DECEMBER 2014 TIME: 1HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***three*** *questions*

**QUESTION ONE (30 MARKS)**

1. Determine the equation of a line which passes through the points A(1,5) and B(4,-2) in the form of y=mx+c (3 marks)
2. Solve the following inequalities giving the answer as a combined inequality and represent the solution on a number and (4 marks)
3. Solve the following pair of simultaneous equations graphically (4 marks)

5x+y=7

3x+2y=0

1. Draw the graph of y for the interval 000. Use the graph to solve the following (5 marks)
2. =0.5
3. cos 2100
4. A quantity P varies directly as Q2. When P=36, Q=3. Find constant of proportionality, the equation connection P and Q and hence the value of Q when P=100 (4 marks)
5. The triangle whose vertices are A(1,4) B(1,1) and C(3,1) is transformed under the matrix of transformation . Write down the co-ordinates of the image A1B1C1.

(3 marks)

1. Make A the subject of the formula (3 marks)

-B=

 h) Draw the graph of the quadratic equation for the interval -3. Use the

graph to find the roots of the equation (4 marks)

**QUESTION TWO (10 MARKS)**

1. Copy and compute the table below (2 marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X0 | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
| Cos 2x0 | 1.0 |  | 0.5 | 0.0 |  | -0.87 | -1.0 |  | -0.5 |  | 0.5 |  | 1.0 |
| Cos(2x0+300) |  | 0.5 | 0 | -0.5 |  | -1.0 |  | -0.5 | 0 |  | 0.87 |  |  |

1. On the same axis, draw the graphs y=cos 2x0 and y=cos (2x0+300). Use the scale 1cm for 150 on the x-axis and 4cm for 1 unit on the y-axis. (5 marks)
2. Use the graph to find the value of x such that cos 2x0=cos(2x0+300)

**QUESTION THREE (10 MARKS)**

1. Complete the following table for the equation (1mark)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -2 | -1 | 0 | 1 | 2 | 3 | 4 |  |
| y | 5 |  | -3 |  | -3 |  |  |  |

1. Draw the graph using the scale: (3 marks)

x-axis: 2cm to represent 1 unit

y-axis: 2cm to represent 1 unit

1. Use the graph to solve the equations
2. x2-3x+1=0 (3 marks)
3. x2=x+2 (3 marks)

**QUESTION FOUR (10 MARKS)**

A School has to take 300 students for a tour. There are two types of buses available, type x and y. Type x can carry 10 passengers and type y can carry 30 passengers. They have to use not more than 20 buses. The number of type x buses used should not be less than type y.

1. Form all the inequalities, which will represent the above information (3 marks)
2. Draw the inequalities and shade the unwanted (3 marks)
3. If the hiring charges were: type x: shs 10,000 and type y: shs 8,000,

 Use the graph to determine number of buses of each type that should be hired to

maximise the cost. Hence determine the maximum cost. (4 marks)

**QUESTION FIVE (10 MARKS)**

1. Draw the triangle whose vertices are A(1,1), B(3,1) and C(3,4). On the same axes, draw the images of ABC under transformation with the matrices given in each case describe fully the transformation. (1 mark)
2. Transformation matrix y= (3 marks)
3. Transformation matrix Q= (3 marks)
4. Transformation matrix H= (3 marks)

**QUESTION SIX (10 MARKS)**

The table below shows the distance travelled by a rocket fired from the ground.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time (sec) | 0 | 1 | 2 | 3 | 4 | 4.5 | 5 | 6 | 7 | 8 |
| Dist (m) | 0 | 85 | 160 | 225 | 280 | 303.75 | 325 | 360 | 385 | 400 |

1. Using a suitable scale, plot the graph of distance against time (5 marks)
2. Using the graph, calculate the average rate of change between 4th and 6th second.

(2 marks)

1. Find the speed of the rocket at the 4th second (3 marks)