**MATHEMATICS METHODS UNIT 1 TEST 1**

**CALCULATOR ASSUMED NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**TIME ALLOWED: 40 MINUTES**

***Show all your working clearly.*** *Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat any question, ensure that you cancel the answer you do not wish to have marked.*

**QUESTION 8 (5 marks)**

Three towns Brooks River (B), Fryman Mill (M) and Swann Place (S) are to cultivate the triangular piece of land that they immediately surround. M is 2000m due South of B. S is on a bearing of  from B and  from M. Calculate the area of this piece of land (to the nearest m).

**QUESTION 9 ( 3,1 marks)**

The area of a sector AOB, in a circle centre O and radius 4 cm is  cm2. Find the size of :

(a) in radians in terms of π.

(b) in degrees

**QUESTION 10 (6 marks)**

Two observers are on opposite sides of a tower, and collinear with its base. The first finds the

angle of elevation of the top of the tower to be , the second finds it to be . If the tower

is 28m high, how far apart are the observers?

**QUESTION 11 (8 marks)**

At 7pm a ship heading North and travelling at 18 km/hr observes a lighthouse on a bearing of . At 8pm the lighthouse is observed on a bearing of . At what time will the ship be due West of the lighthouse – and how close will it be at this time?

**QUESTION 12 (5, 2 marks)**

A wireless mast is supported by two wires MP and MQ, each attached to it at the point M, 12m from the base A of the mast. Q, P and A are all on level ground, Q being due East and P due South of the mast. If MP and MQ are respectively 15m and 18m long:

(a) Find the distance between P and Q

(b) Find the angle QMP between the wires

**QUESTION 13 (6 marks)**

An equilateral triangle of side length 9 cm has circles with centres at each of the vertices drawn to pass through the other two vertices. Find the area common to the three circles.

**QUESTION 14 (2,1 marks)**

The owner of a shop that sells computers calculates that his total weekly profit is given by the rule:

Total profit in dollars =,

where  is the profit per computer sold,  is the number of computers sold in the week and  is the fixed weekly cost of running the shop.

If he sells ten computers in a week his total profit is $360.

If he only sells five computers in the week he makes a loss of $190.

1. Calculate  and .
2. What is the least number of computers he can sell and still make a profit?

**TOTAL MARKS: 39**

**REFERENCES**

