# SAINT IGNATIUS' COLLEGE

# 2003

# GENERAL MATHEMATICS

# Year 12 HSC

# ASSESSMENT TASK 3

**Time allowed: 50 minutes**

**Directions to Students**

- There are two sections, Trigonometry and Probability.
- There are four separate sheets of paper, all questions are to be answered in the spaces on the paper.
- Questions are on both sides of the paper.
- Show all working, marks will be awarded for working.
- Diagrams are not drawn to scale.
- Clearly write your name and teachers name on each page.
- On the following pages you will find a formula sheet.

## Section 1 Trigonometry

1. The Leaning Tower of Pisa was built to 56 metres high but leans 5.2 metres from the perpendicular. Find the angle the Tower makes with the horizontal ground.

56 m

θ

5.2 m

_____

_____

_____
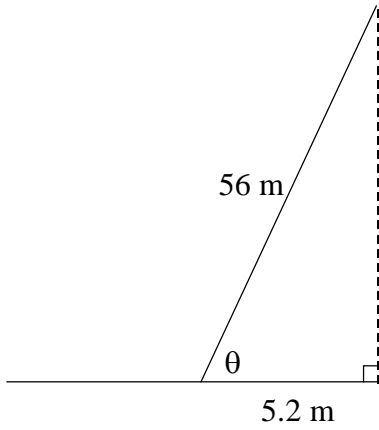
_____**(1 mark)**


2. The angle of elevation of the top of a tree from a point P on the ground is 30°. The point P is 28 metres from the base of the tree. Find the height of the tree.

h

30°

P

28 metres

_____

_____

_____
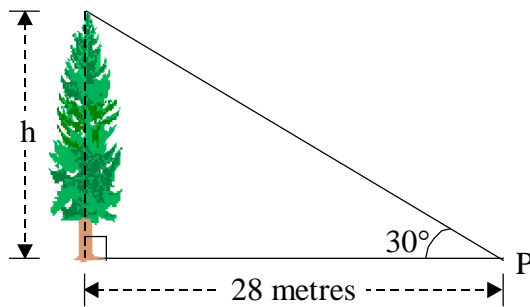
_____**(1 mark)**

3. Radar equipment in a tower 30 m above sea level detects an object at sea at an angle of depression of 8°.  If the base of the tower is at sea level, how far, to the nearest metre, is the object from the base of the tower?
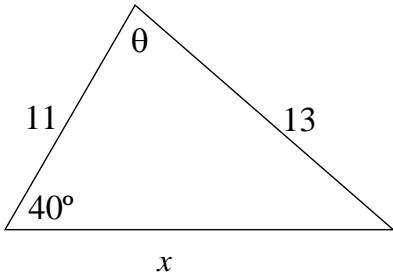
_____

_____

_____

_____

_____**( 3 marks)**

4. i) Using the sine rule, find the size of angle θ to the nearest degree.



Note $\theta$ is in this bottom corner.

_____

_____

_____

_____

_____**(2 marks)**

ii) Hence apply the sine rule to find the length of x to the nearest metre.

_____

_____

_____

_____**(3 marks)**

5. A radial survey of a tract of land is shown.



J (351°)

63 m

52 m    O    40 m   ── K (090°)

(255°) M

61 m

L (172°)
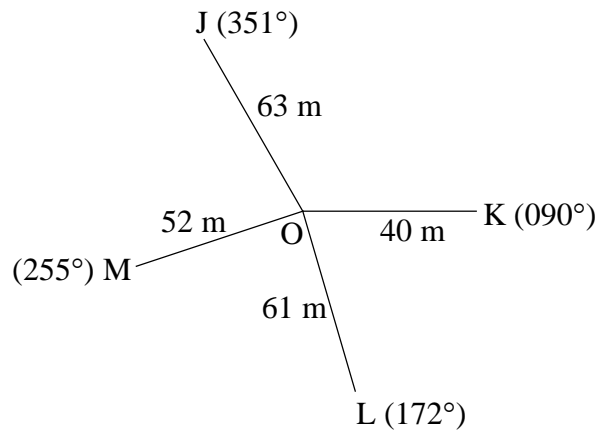
NOT TO SCALE

i.    Show that ∠JOK is 99°

_____

_____**(1 mark)**

ii.    Find the area of triangle JOK to the nearest square metre.

_____

_____

_____**(2 marks)**

iii.    Use the cosine rule to find the length of the boundary JK.  Give your answer to the nearest metre.

_____

_____

_____

_____**(2 marks)**

# Section 2 Probability

1.i) What is the probability of throwing a 3 on a normal die?

_____(1 mark)

ii) Calculate the number of times you would expect to throw a 3 in 100 rolls of the die.

_____

_____(1 mark)


2. A toaster produced by 3B electricals has a 73% chance of remaining fault free through its warranty period. Two toasters are selected at random

i) Complete the following tree diagram by displaying the correct probability on each branch.

**(1 mark)**

first toaster                      second toaster

0.73        • not faulty
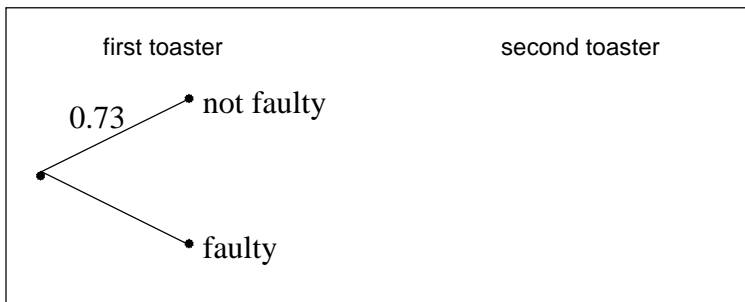
            • faulty


ii) What is the probability that both toasters are faulty?

_____

_____( 1 mark)

iii) What is the probability at least one toaster is faulty?

_____

_____(1 mark)

3. The numbers 2 , 3 , 4 are written on separate cards and placed in a box. Two cards are selected at random and used the form a 2 digit number. The first card drawn represents the tens the second card the units.

a) Draw a tree diagram to represent this information. **(2 marks)**

b) What is the probability that the number formed is:

       i) 23 _____

       ii) divisible by two _____ **(2 marks)**

4. A basket ball team of 7 players are lining up for a photo. They will be sitting in one row.

i) In how many different ways can the team be arranged in the row?

_____

_____**(1 mark)**

ii) John is one of the team members. What is the probability that he will be sitting in the middle of the row?

_____

_____**(1 mark)**


5. A batch of sniffer dogs is trained by customs to smell drugs in suitcases. Before they are used at airports they must pass a test. The results of that test are shown in the two-way table below.

|  | Detected | Not detected | Total |
|---|---|---|---|
| No of bags with drugs | 24 | 1 | 25 |
| No. of bags without drugs | 11 | 164 | 175 |
| Total | 35 | 165 |  |

i) How many bags did the sniffer dogs examine? _____**(1 mark)**

ii) Based on the above results, what is the probability that the dogs will not detect a bag carrying drugs?_____

_____**(1 mark)**


6. A debating team of 3 is to be chosen from 8 people.

i) In how many ways can this team be chosen?

ii) In how many ways can the chosen team then be ordered as speakers?

_____

_____

_____

_____**(2 marks)**