

## General Mathematics Paper 2, May/June. 2012

### Question 1

(a) Simplify:  $\frac{1\frac{1}{4} + \frac{7}{9}}{1\frac{4}{9} - 2\frac{2}{3} \times \frac{9}{64}}$

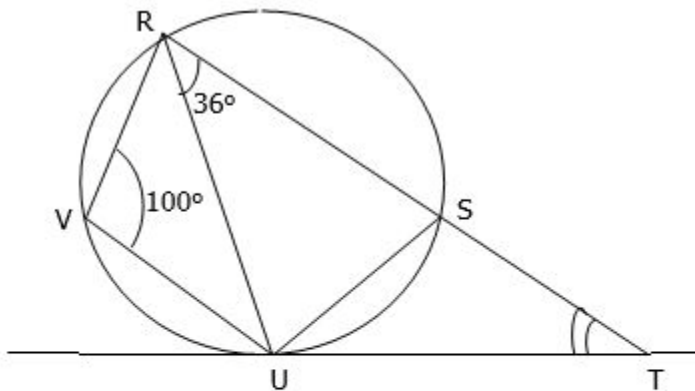
(b) Given that  $\sin x = \frac{2}{3}$ , evaluate, leaving your answer in surd form and without using tables or calculator,  $\tan x - \cos x$ .

### Question 2

Sonny is twice as old as Wale. Four years ago, he was four times as old as Wale. When will the sum of their ages be 66?

### Question 3

(a)



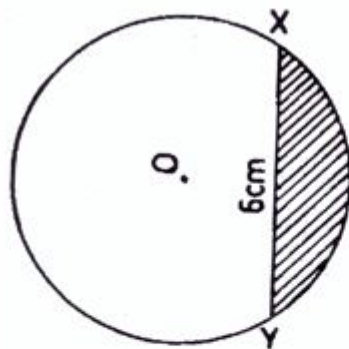
In the diagram,  $\overline{TU}$  is a tangent to the circle.  $\angle RVU = 100^\circ$  and  $\angle URS = 36^\circ$ . Calculate the value of angle  $STU$ .

(b) In triangle  $XYZ$ ,  $|XY| = 5\text{ cm}$ ,  $|YZ| = 8\text{ cm}$  and  $|XZ| = 6\text{ cm}$ .  $P$  is a point on the side  $XY$  such that  $|XP| = 2\text{ cm}$  and the line through  $P$ , parallel to  $YZ$  meets  $XZ$  at  $Q$ . Calculate  $|QZ|$ .

#### Question 4

- (a) A box contains 40 identical discs which are either red or white. If the probability of picking a red disc is  $\frac{1}{4}$ , calculate the number of :
- white discs;
  - red discs that should be added such that the probability of picking a red disc will be  $\frac{1}{3}$ .
- (b) A salesman bought some plates at N50.00 each. If he sold all of them for N600 and made a profit of 20% on the transaction, how many plates did he buy?

#### Question 5



In the diagram, O is the centre of the circle and XY is a chord. If the radius is 5cm and  $|XY| = 6$  cm, calculate, correct to 2 decimal places, the:

- angle which XY subtends at the centre O;
- area of the shaded portion.

#### Question 6

- (a) A boy had M Dalasis (D). He spent D 15 and shared the remainder equally with his sister. If the sister's share was equal to  $\frac{1}{3}$  of M, find the value of M.
- (b) A number of tourists were interviewed on their choice of means of travel. Two-thirds said that they travelled by road,  $\frac{13}{30}$  by air and  $\frac{4}{15}$  by both air and road. If 20 tourists did not travel by either air or road,
- represent the information on a Venn diagram;
  - how many tourists
    - were interviewed;
    - travelled by air only?

### Question 7

- (a) (i) Using a scale of 2 cm to 1 unit on both axes, on the same graph sheet, draw the graphs of  $y - \frac{3x}{4} = 3$  and  $y + 2x = 6$ .
- (ii) From your graph, find the coordinates of the point of intersection of the two graphs.
- (iii) Show, on the graph sheet, the region satisfied by the inequality  $y - \frac{3}{4}x \geq 3$ .
- (b) Given that  $x^2 + bx + 18$  is factorized as  $(x + 2)(x + c)$ . Find the values of  $c$  and  $b$ .

### Question 8

A point H is 20m away from the foot of a tower on the same horizontal ground. From the point H, the angle of elevation of the point (P) on the tower and the top (T) of the tower are  $30^\circ$  and  $50^\circ$  respectively. Calculate, correct to 3 significant figures:

- (a)  $\angle PT$ ;
- (b) The distance between H and the top of the tower;
- (c) The position of H if the angle of depression of H from the top of the tower is to be  $40^\circ$ .

**Question 9**

Three towns X, Y and Z are such that Y is 20 km from X and 22 km from Z. Town X is 18 km from Z. A Health Centre is to be built by the government to serve the three towns. The Centre is to be located such that patients from X and Y will always travel equal distances to access the Health Centre while patients from Z will travel exactly 10 km to reach the health Centre.

- (a) Using a Scale of 1cm to 2km, find by Construction, using a pair of compasses and ruler only, the possible positions the Health Centre can be located.
- (b) In how many possible locations can the health Centre be built?
- (c) Measure and record the distances of the locations from town X.
- (d) Which of these locations would be convenient for all the three towns?

**Question 10**

Class interval	Frequency
60 – 64	2
65 – 69	3
70 – 74	6
75 – 79	11
80 – 84	8
85 – 89	7

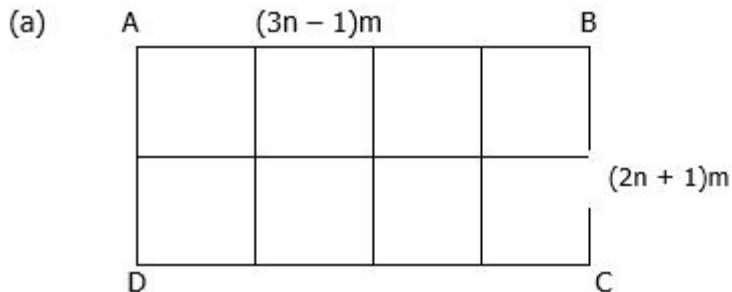
90 – 94	2
95 - 99	1

The table shows the distribution of marks scored by students in an examination.

Calculate, correct to 2 decimal places, the (a) mean;

(b) standard deviation of the distribution.

### Question 11



In the diagram, ABCD is a rectangular garden  $(3n - 1)m$  long and  $(2n + 1)m$  wide. A wire-mesh 135m long is used to mark its boundary and to divide it into 8 equal plots. Find the value of  $n$ .

- (b) A cylinder with base radius 14 cm has the same volume as a cube of side 22 cm. Calculate the ratio of the total surface area of the cylinder to that of the cube. [Take  $\pi = \frac{22}{7}$ ].

### Question 12

- (a)  $P$  varies directly as  $Q$  and inversely as the square of  $R$ . If  $P = 1$  when  $Q = 8$  and  $R = 2$ , find the value of  $Q$  when  $P = 3$  and  $R = 5$ .
- (b) An aeroplane flies from town A(20°N, 60°E) to town B(20°N, 20°E).

- (i) If the journey takes 6 hours, calculate, correct to 3 significant figures, the average speed of the aeroplane.
- (ii) If it then flies due north from town B to town C, 420 km away, calculate, correct to the nearest degree, the latitude of town C.

[Take radius of the earth = 6400 km and  $\pi = 3.142$ ]

### Question 13

Copy and complete the table of values for  $y = 1 - 4 \cos x$ .

X	$0^\circ$	$30^\circ$	$60^\circ$	$90^\circ$	$120^\circ$	$150^\circ$	$180^\circ$	$210^\circ$	$240^\circ$	$270^\circ$	$300^\circ$
Y	-3.0			1.0				4.5			-1.0

- (b) Using a scale of 2cm to  $30^\circ$  on the x-axis and 2 cm to 1 unit on the y – axis, draw the graph of  $y = 1 - 4 \cos x$  for  $0^\circ \leq x \leq 300^\circ$ .
- (c) Use the graph to:
- (i) solve the equation  $1 - 4\cos x = 0$ ;
- find the value of y when  $x = 105$ ;
- find x when  $y = 1.5$ .