



S. Thomas' College - Mount Lavinia
Term II Examination - 2016
Mathematics II

Middle 6

Time : 2 ½ hours

Answer ten questions selecting five questions from Part A and 5 questions from Part B

Part A

1. a) When importing a vehicle valued at Rs. 2.5 million the importer needs to pay 60% as custom duty.
- i. How much is the custom duty?
 - ii. What is the value of the vehicle after paying duty?
 - iii. If the vehicle was sold at Rs. 4.5 million, find the percentage of profit.
- b) A person who owns a house which lies within the limits of a certain municipal council which charged 8% as rate, has to pay quarterly rates of Rs. 480.
- i. How much does he pay as rate for a year?
 - ii. Find the assessed annual value of the house.
2. An incomplete table is given below to draw the graph of the function $y = 5 - x^2$.

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

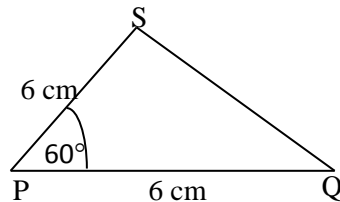
- a) i. Find the value of y when $x = - 2$.
- ii. Draw the above graph of the function taking 10 small squares as 1 unit along the both axes.
- b) Using the above graph.
- i. Write the equation of the axis of symmetry.
 - ii. Write the coordinate of the maximum point.
 - iii. Write the range of x values, in which the function is increasing positively.
 - iv. Find the roots of the equation $5 - x^2 = 0$

3. a) Factorize
- $2x(3x - 2) + 9x - 6$
 - $t^3 - tp^2$
- b) Find the least common multiple of
 $5(p - 2)$, 20 , $25(2 - p)^2$
- c) Express as a single fraction.
- $\frac{4x-3}{2} - \frac{3x-2}{6}$
 - $\frac{2}{p} + \frac{3}{2p+1} + \frac{3}{p}$
4. i. Simplify $\frac{(a^4)^{-3} \times (2a^2)^2}{a^{-8}}$
- ii. Find the value of $\log_5 100 + \log_5 5 - \log_5 4$
- iii. Using the logarithmic table find the value of $\frac{82.5 \times 4.63}{21.8}$
5. i. Solve. $\frac{3x}{x-2} - 3 = 6$
- ii. Solve the following pair of simultaneous equation.
 $2x - 3y = 8$
 $3x - 14 = 2x - y$
- iii. Find the roots of $x^2 + x - 20 = 0$
6. a) 9 men completed $\frac{3}{4}$ of a certain task within 12 days. Three of them left afterwards.
- How many man days were there within 12 days?
 - What is the magnitude of the task in man days?
 - If it is required to complete the remaining work within 2 days, how many extra men are required to work?
- b) 2 pipes are used to fill a tank with water. One pipe takes 12 minutes to fill the tank completely whereas the other pipe takes 6 minutes. If the both pipes are opened at once how long will it take to fill the tank?

Part B

7. In an arithmetic progression the 1st term is 3 and the 8th term is 38.
- i. Find the common difference.
 - ii. What is the 20th term of this progression?
 - iii. Which term of the progression is 33?
 - iv. Find the sum of the first 20 terms.
 - v. Using the above (iv) deduce the sum of the first 20 terms of the arithmetic progression which has 13, 18, 23, as terms.

8. Construct the following using only cm/mm straight edge and a pair of compass.
- i. Construct the Δ PQS according to the information given in the diagram.



- ii. Draw the bisector of the angle $\hat{S}PQ$.
 - iii. Mark the interesting point of the angle bisector and SQ as O.
 - iv. Mark the point 'R' on the produced PO such that PO = OR.
 - v. Join RS and RQ.
 - vi. What type of quadrilateral is PQRS?
9. The following table shows the information about the number of accidents that happened daily during a month.

No of accidents	No of days
0	3
1	4
2	8
3	7
4	4
5	2
6	2

- i. What is the mode of the distribution?
- ii. How many accidents happened during the month in total?
- iii. Find the mean number of accidents which happened in a day during this month.
- iv. Find the percentage, that the number of accidents happened more than 2 per day.
- v. Show that the probability of an accident not happening for a day is less than 0.2.

10. A survey was done among 50 families regarding their children. 12 families had only boys whereas 10 families had only girls and 32 families in total had children

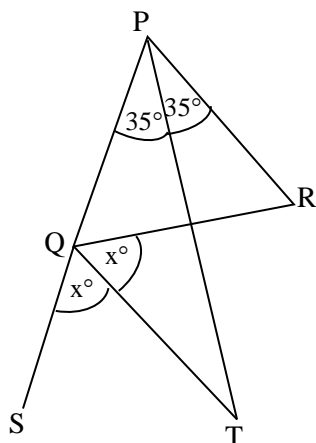
Taking ϵ - {The families that participated in the survey}
 B - {Families who had boys}
 G - {Families who had girls}

- i. Represent the above information in a Venn diagram.

Using the above Venn diagram find

- ii. The number of families who had both girls and boys.
- iii. The number of families who had girls.
- iv. The number of families who had boys.
- v. The number of families who do not have children
- vi. Shade the region $(B' \cap G) \cup (B \cap G')$ in the Venn diagram.

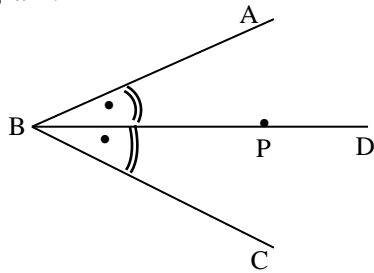
11. a) PQR is a triangle where $PQ = QR$. PQ is produced to S. The bisector of the angle \hat{RPQ} and \hat{SQR} meet at T, as shown in the given diagram.



Find the value of

- i. x°
- ii. \hat{PTQ}
- iii. Show that the triangle PQT is an isosceles triangle.
- iv. Can $PR \parallel QT$?
Explain with reasons.

- b) P is a point on the bisector of the angle ABC as shown in the following diagram.



The two perpendiculars drawn from P to AB and BC, meet AB and BC at Q and R respectively.

- i. Copy the diagram and mark the given information on it.
 - ii. Prove that $\triangle BPQ \cong \triangle BRP$
 - iii. Show that $PQ = PR$
12. PQRS is a parallelogram. X and Y are two points on the diagonal PR such that $PX = XY = YR$.
- i. Draw a diagram to illustrate the above information
 - ii. Prove that $\triangle PQX \cong \triangle RYS$.

Show that

- iii. $QX = SY$
- iv. $QX \parallel SY$
- v. QXSY is a parallelogram