S. Thomas' College – Mount Lavinia
Term II Examination – 2015
Mathematics – I

Grade 10 ____ **Name: _____** **Index No: _____** **Time: 2 hours**

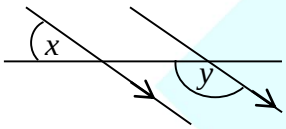
Part A

- ***Answer all the questions***

1. Find the cost of 10 pens if the cost of one pen is *Rs.8.50*

2. Simplify $1.08 + 0.3$

3. Simplify $\frac{2}{5} - \frac{3}{5} + \frac{4}{5}$

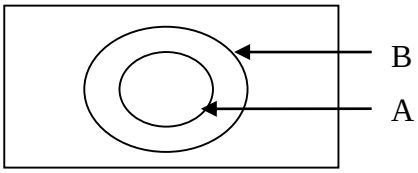
4. 

Find the value of $x + y$

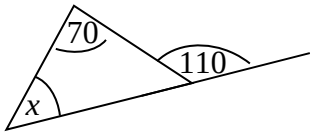
5. Solve $\frac{18}{x} = 6$

6. The area of a rectangle is $48cm^2$. Find the width of the rectangle if the length is $8cm$.

7. Shade the area denoted by $A \cap B$ in the given Venn diagram.



8. Find the value of x



9. If the mode of the following distribution is 4, find the value of x

2, 5, 8, 4, 5, x, 6, 4

10. Convert $1\frac{1}{2}\ l$ to ml

11. Find the value of $x + y$ **without** solving the two equations

$3x - y = 8$
$x + 5y = 12$

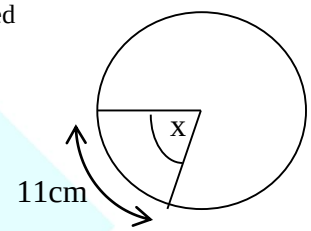
12. If it takes 8 men 12 days to build a certain wall, how many men would it have taken for the wall to be built in 6 days?

13. The Rupee equivalents of 1 American Dollar and 1 Japanese Yen are Rs.133.87 and Rs.1.08 respectively.

(i) How many Rupees is 100 American Dollars?

(ii) How many Japanese Yens is Rs.3240/-?

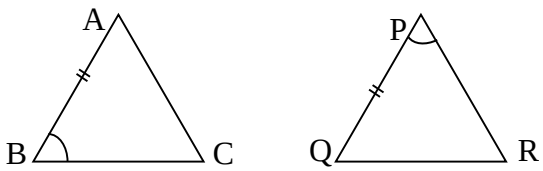
14. The perimeter of a circular metal sheet is 66cm. A sector whose arc length is 11cm is removed from the metal sheet. If the angle of the sector at the centre is x, find the value of x



15. What are the solutions of the following $(x + 3)(x - 2) = 0$

16. Find the L.C.M. of the following $2x$, $5x^2$, $2(x - 3)$

17. In the triangles ABC & PQR, $A\hat{B}C = Q\hat{P}R$ and $AB = PQ$. What is the remaining feature in order for the two triangles to be congruent under the (S, A, S) case?



18. A man took out a loan of Rs.3000/- at an annual simple interest rate of 14% and was released from the loan by paying Rs.4260/-. For how long was the loan taken?

19. Expand the following and express in the form $ax^2 + bx + c$
$(2x + 1)(x - 3)$

20. A straight line is drawn through the points $(4, 3)$ & $(0, -5)$. Find its

(i) Gradient

(ii) Equation

21. Make x the subject of the formula $y - bx = ax$

22. Simplify $\frac{3x}{a-b} - \frac{x}{b-a}$

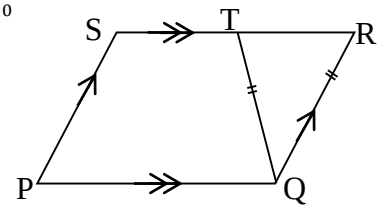
23. If $lg2 = 0.30$ & $lg3 = 0.47$, find the value of $lg1.5$

24. The seller makes a profit of 25% by selling an item for Rs.750/-

(i) What is the buying price of the item?

(ii) What is the profit in Rupees?

25. $PQRS$ is a parallelogram and QT is drawn such that $QR = QT$. $S\hat{P}Q = 75^0$



(i) Show that $PS = QT$

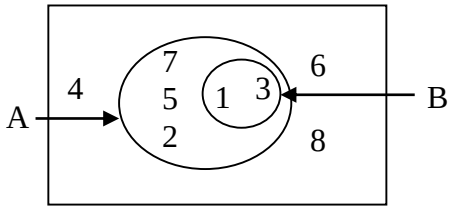
(ii) Find the value of $T\hat{Q}R$

26. Mangoes are divided between A, B & C according the ratio $3:4:5$. If B received 60 mangoes,

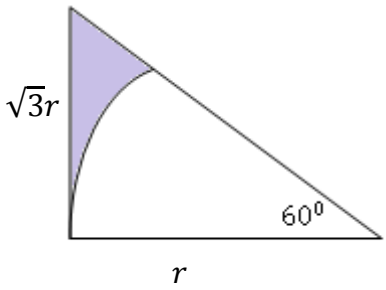
(i) How many mangoes did A receive?

(ii) Find the total number of mangoes

27. List the elements of $B' \cap A$ according to the given Venn diagram.



28. Show that the area of the shaded region of the diagram is $\frac{r^2}{2}[\sqrt{3} - \frac{\pi}{3}]$



29. Write down two special features of the Rhombus.

30. A certain square number has 2 digits. The sum of the 2 digits is also a square number. Write the two square numbers of the 2 digits.

Part B

- ***Answer all the questions***

1. Kasun gave $\frac{3}{8}^{th}$ of a piece of land to his daughter, $\frac{2}{5}^{th}$ of the remaining to the son and the remaining 1.5 ha (hectares) to his wife.

(i) What fraction of the entire land was given to the son?

(ii) What fraction of the entire land was given to the wife?

(iii) How many hectares (ha) did the son receive?

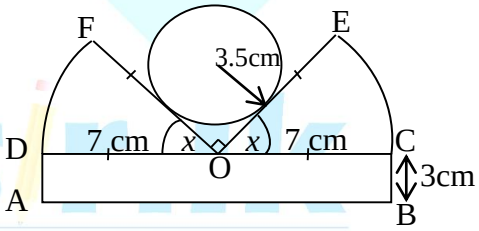
(iv) How many hectares (ha) was the entire land?

(v) If it costs Rs.5000/- to measure $1ha$ of land, how much would it cost to measure the entire piece of land?

2. A rough diagram of a trophy which was to be awarded at a Literature event is shown below.

(i) Find the value of x

(ii) Find the area of the rectangle $ABCD$



(iii) Find the area of the sector COE

(iv) Find the area of the circle

(v) Find the total area of the metal sheet required to make the trophy

(vi) If it costs Rs.20 to paint $1cm^2$ of the trophy with gold paint, find how much it would cost to paint the entire trophy.

3. The estimated annual value of a house is Rs.80,000/-. The Municipal Council charges 6% of the estimated value as rates.

(i) Calculate the rate that has to be paid in one year.

(ii) Calculate the amount that has to be paid in a quarter.

(iii) If the total annual rate is paid on or before the 31st of January, the Municipal Council offers a rebate (discount) of 10%. Find the amount that needs to be paid if the owner pays the rates on or before the 31st of January.

(iv) The above house is given on rent, and the landlord spends 20% of the annual rental on repairs in the house. From the balance rental he pays the above rates after the 31st of January and has Rs.43,200/- remaining.

a. After spending on repairs, how much of the total annual rental is remaining (leave the answer as a fraction)?

b. How much is the total annual rental?

c. How much is the monthly rental?

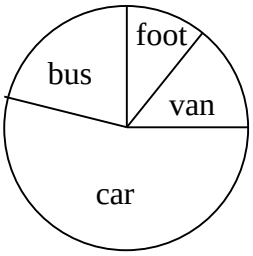
4. (a) The choice of venues for the annual class trip as selected by 120 Grade 10 students are given below.

Venue	No. of students	Angles
Sigiriya	15	
Polonnaruwa	40	
Mahiyanganaya	35	
Anuradhapura	30	

(i) Calculate the angles required to represent each of the above venues in a pie chart

(ii) Draw the pie chart

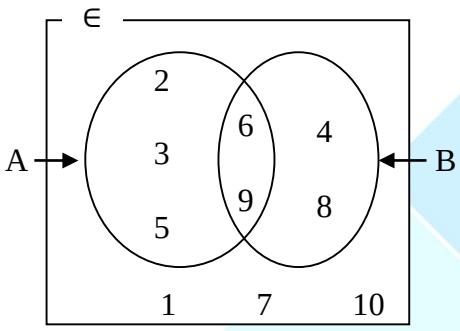
(b) The methods of transport used to come to school by 36 students is shown in the pie chart below



(i) If the angle representing the use of cars is 200^0, calculate the number of students who travel by car

(ii) If the number of students travelling by van is 8, find the angle used to represent the same in the pie chart.

5. (a) List the elements for the following according to the given Venn Diagram



(i) $A \cap B' =$

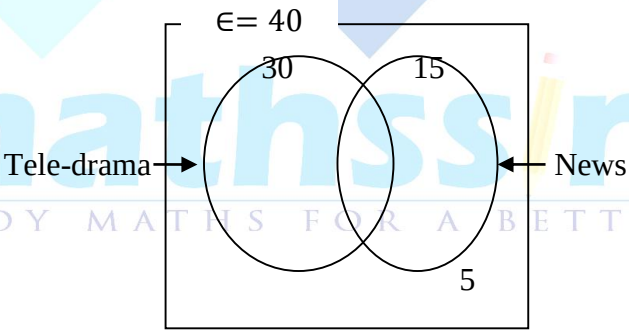
(ii) $(A \cup B)' =$

(iii) $(A \cap B)' =$

(iv) $A' \cap B' =$

(v) $A \cup B =$

(b) Grade 10 students were questioned about their preferred Television programme. An incomplete Venn diagram with the collected information is given below. Complete the Venn diagram.



(i) How many chose both programmes?

(ii) How many chose Tele-dramas only?

(iii) How many chose News only?

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STUDY MATHS FOR A BETTER PATH

S. Thomas' College – Mount Lavinia
Term II Examination – 2015
Mathematics – II

Grade 10 **Time: 2½ hours**

Please answer Ten (10) questions only. Five (05) questions from part A and Five (05) questions from part B only.

Part A

- ***Answer only 5 questions***

1. The import price of a certain electronic item is Rs.40,000/-. An import tax of 20% of the price of the item is charged when it is imported. The price of the item is marked in order to get a 40% profit and when the item is bought outright, a 5% discount is given.

(i) What is the cost of the electronic item together with the import tax?
(ii) What is the marked price of the item?
(iii) What is the discount received by the buyer when the item is purchased outright?
(iv) What is the price of the item after the discount?
(v) What is the profit made by the seller when the item is sold at the above price?
(vi) What is the profit percentage made by the seller?

2. An incomplete table of values used to draw the graph $y = -x^2 + 6$ is given below.

x	-3	-2	-1	0	1	2	3
y	-3	_ _ _ _	5	6	5	2	-3

(i) Find the value of y when $x = -2$
(ii) By taking 10 small squares as one unit for both the axes x and y, draw the above graph in the graph paper.
(iii) Using the graph;
a. Find the maximum value of the graph.
b. Write the equation of the axis of symmetry.
c. Write the co-ordinates of the turning point (point of refraction).
d. What is the range of x, when the graph increases positively?
e. What is the positive root of the equation $6 - x^2 = 0$?

3.

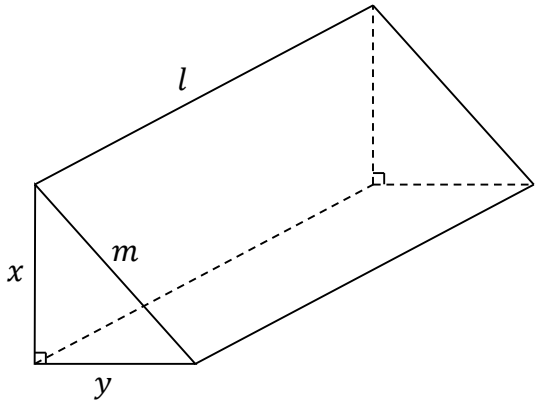
(i) Solve $18 - 5(x + 1) = 3(x - 1)$

(ii) Solve $\frac{3}{x+2} - \frac{1}{3(x+2)} = \frac{2}{3}$

(iii) Three Wheelers and Motor Bicycles are parked in a vehicle park. The total number of vehicles in the park is 35.The total number of tyres in the parked vehicles is 90.

a. Taking x as the number of Three Wheelers and y as the number of Motor Bicycles, build two simultaneous equations with the given information.
b. By solving the above equations, find the number of Three Wheelers and the number of Motor Bicycles in the park separately.

4. The given figure shows a prism whose cross section is a right angled triangle.



(i) Using the data given in the figure, build an algebraic expression for the total surface area of the prism.

(ii) If $x = 12cm \& y = 5cm$; calculate the value of m.

(iii) If the total surface area is $540cm^2$ calculate the length of the prism (l).

(iv) Express the volume of the prism in x, y, l.

(v) Using the above, find the volume of the prism.

5. (a) Dinuk took a loan for Rs.20,000/- at an annual simple interest rate of 10% with the promise of paying back the total at the end of the year. However, at the end of the year, he was not able to pay the total amount, but instead paid half of the loan and the interest for the first year. He paid Rs.11,200/- (the balance loan amount together with the interest for the second year) and was released from the loan at the end of the second year.

(i) How much did Dinuk pay as interest at the end of the first year?

(ii) How much did Dinuk pay in total at the end of the first year?

(iii) How much did Dinuk pay as interest at the end of the second year?

(iv) Show that the interest rate for the balance loan amount for the second year was 12%.

(b) The annual income of a businessman is $Rs.1{,}300{,}000/-$. The first $Rs.500{,}000/-$ of the salary is tax free. The second $Rs.500{,}000/-$ is taxed at 4% while the next $Rs.500{,}000/-$ is taxed at 8% by the government as income tax. Find the total income tax which the businessman has to pay.

6.

(i) If $lg2 = a$ and $lg7 = b$ show that $\lg\left(2\frac{6}{7}\right) = a - b + 1$

(ii) Find the value of the following

$$\log_{10} 25 - \log_{10} 4 + \log_{10} 8 - \log_{10} 5 + 2$$

(iii) Find the value of the following using logarithmic tables

$$\frac{83.81 \times 5.873}{10.46}$$

Part B

- ***Answer only 5 questions***

7. (a) Factorise the following

(i) $x^2 + 2x - 15$

(ii) $2x^2 + x - 3$

(iii) $9x^2 - 25$

(b)

(i) Find the L.C.M. of the following

$$x^2 - 4, x^2 + 2x$$

(ii) Three bells are rung at $12min$, $18min$ and $24min$ time intervals. All three bells are rung together for the very first time. Thereafter, the bells continue to ring according to the above specified time intervals. Find the total time taken (in hours) for all three bells to ring together for the second time.

(c) Simplify

$$\frac{4}{(x-3)(x+5)} - \frac{3}{(x+4)(x+5)}$$

8. Using only a straight edge with a mm/cm scale and a compass, construct the following. Show the construction marks clearly.

(i) Construct the triangle ABC such that $AB = 10cm$, $B\hat{A}C = 30^0$ and $A\hat{B}C = 60^0$.

(ii) Construct and complete the parallelogram $ABCD$ such that the point D is located on the same side as the line AC but opposite to point B.

(iii) Construct the locus of a point moving at equi-distance from the points A and B.

(iv) Name the point the above locus intersects with the line AB as O. Construct a circle such that O is the centre and OA is the radius.

(v) Is $A\hat{B}C = A\hat{D}C$? Give reasons.

9. The distance travelled by a company owned vehicle in 50 days is given in the incomplete table below. Copy the table into your answer scripts.

Class Interval Distance (km)	**Mid value (x)**	**Frequency (f)**	***fx***
0 – 8		3	
9 – 17		7	
18 – 26		8	
27 – 35		14	
36 – 44		10	
45 – 53		6	
54 – 62		2	

(i) Complete the *Mid Value* column

(ii) Complete the *fx* column

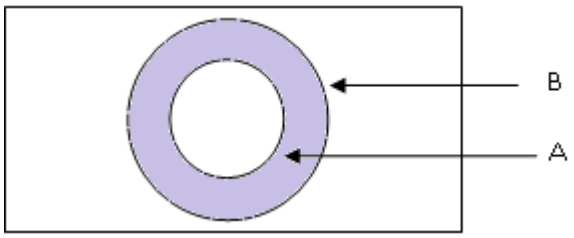
(iii) Calculate the mean distance travelled by the vehicle in a day.

(iv) How many days did the vehicle travel more than 44 km?

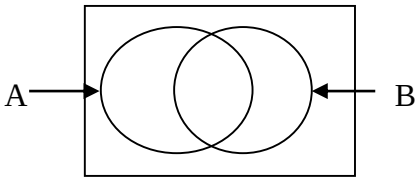
(v) If the cost of fuel for 1 km is Rs.15/-, find how much it costs for fuel for a day.

10.

(i) Express the shaded area in the given Venn Diagram in set notation.



(ii) Copy the given Venn diagram into the answer scripts and shade the area denoted by $(A \cap B') \cup (A' \cap B)$



(iii)

a. An experiment is designed such that the top shown in the figure is twisted and the number on the triangle touching the floor is selected. Write the Sample Space of the outcomes of the experiment.

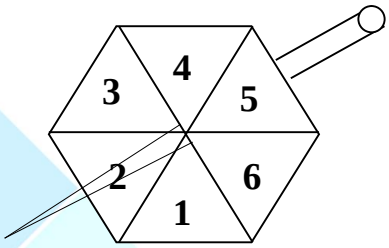
b. How much is $n(S)$

c. Write the probabilities of each of the following situations

i. The top landing on number 5.

ii. The top landing on a even number

iii. The top landing on a Triangular number.



11.

In the triangle ABC, O is the midpoint of side BC. The line AO has been produced to D such that $AO = OD$.

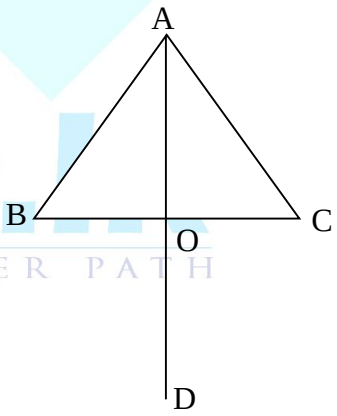
(a) Copy the diagram into the answer scripts and mark all the given data and join BD and DC.

(b) Prove that $\Delta AOB \equiv \Delta CDO$

(c) Show that $B\hat{A}O = C\hat{D}O$

(d) If AO is the bisector of $B\hat{A}C$, show that ABC is an isosceles triangle.

(e) Show that $A\hat{O}B = 90^0$



12. (a)

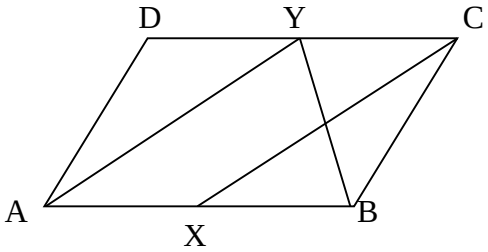
$ABCD$ is parallelogram. X and Y are the midpoints of AB and DC respectively. Copy the given diagram into the answer scripts and mark all the given data.

(i) Name an angle equal to $D\hat{A}B$. (Give reasons)

(ii) Prove that $AX = YC$

(iii) Prove that $AXCY$ is a parallelogram

(iv) Show that XC bisects the straight line YB



(b) Write two differences between a Rhombus and a Square.