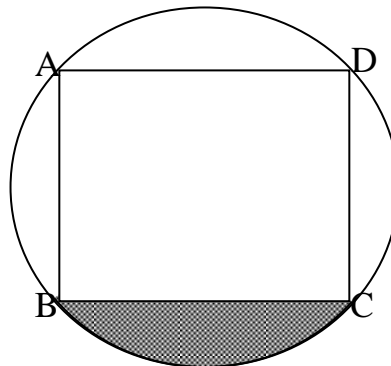


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1. Given that  $a \oplus b = \frac{1}{2}(a + b)$  and  $a \otimes b = \sqrt{ab}$ . Calculate  $(2.5 \otimes 10) \oplus 36$ .
2. Solve the simultaneous equation  $x = 3 + 4y$   
 $y = 2 + 3x$
3. Solve the inequality;  $-3x + 5 < 2x - 15$  and represent the solution set on a number line.
4. Solve the equation;  $10^2 - 7a = 3$ .
5. Without using tables or calculators find the value of;
  - (i)  $\cos 750^\circ$
  - (ii)  $\sin 420^\circ$
6. Find the image of  $(3,5)$  under an enlargement about centre  $(0,0)$  by scale factor 2 followed by a reflection in the y- axis.
7. Given that  $t = \sqrt{\frac{a-b}{1+ab}}$ , make b the subject of the formula.
8. Find the equation of the perpendicular bisector of line where  $A(-1,4)$  and  $B(4,7)$ .
9. In the figure below is a square ABCD inscribed in a circle. If the radius of the circle is 6cm, calculate the area of the shaded.



10. A bag contains 5 red and 4 black beads. Two beads are taken out of it. What is the probability that the first is red and second black;
  - (i) if the first bead is replaced .
  - (ii) if the first bead is not replaced.

## Section B (60 marks)

11. Shown below are marks scored by 60 students in a math test.

45	80	67	75	56	45	30	25	40	50
40	62	90	19	45	60	52	81	55	80
69	43	20	31	21	50	54	31	30	40
49	40	32	70	25	39	40	72	50	49
47	39	60	53	45	71	89	47	56	82
31	30	56	73	60	69	51	41	66	70

- Construct a grouped frequency table having class intervals 10 marks, beginning with 15–24 class group.
- Using your grouped frequency table to calculate the mean mark of the candidates.
- Represent the above results on a histogram.
- Use the histogram to estimate the mode.

11. Using a ruler and a pair of compasses and a pencil only;

- Construct a triangle PQR in which  $\overline{QR} = 12\text{cm}$ ,  $\overline{PQ} = 8\text{cm}$   $\angle PQR = 75^\circ$ .
- From P construct a perpendicular to  $\overline{QR}$  to meet  $\overline{QR}$  at S.
- Construct the bisector of  $\angle PRQ$  to meet  $\overline{PS}$  at T
- Measure and write down the length of  $\overline{QT}$ .

12. ABCD is a parallelogram with A(1, -1), B(2, 7) and C(-10, 6).

- Find the coordinates of D
- Prove that ABCD is rhombus.
- Show that the diagonals bisect each other at right angles.

13. P', Q' and R' are the images of P(-2, 3), Q(2, 6) and R(5, 3) respectively under an enlargement of scale factor 2, centre (0, 0). Show that the area of triangle P'Q'R' to the area of triangle PQR is 4 : 1

14. Draw a graph of  $y = \sin \theta$  for  $0^\circ \leq \theta \leq 360^\circ$

- (i) Use the graph to read off  $\sin 330^\circ$   
(ii) Find the sine whose value is 0.72
16. (a) It is given that  $y$  varies partly as  $x$  and partly inversely as the square of  $x$ . It is also given that  $y = 3$  when  $x = 1$  and that  $y = 5$  when  $x = 0.5$ . Find  $y$  when  $x = 1.5$   
(b) It takes 8 days for 9 men to weed a field of maize. How long would it take 6 men to weed the same size of field if the work at the same rate?
17. Joanita intends to invite six friends to her home. She wants to give each of them a samosa or a chapatti and have at least one of the items for herself. A samosa costs shs. 500 and a chapatti costs shs. 1000 and she has shs. 10,000 altogether. The number of the chapattis must be at least half the number of samosas.  
(i) Form inequalities relating the number of samosas and chapatti Joanita can buy.  
(ii) Graph the inequalities in (i) above as a region.  
(iii) Mark lattice points showing possible solutions.  
(iv) What is the greatest number of samosas that she can buy?  
(v) What is the greatest number of chapattis that she can buy?  
(vi) Which solutions use up all the available money?  
(vii) Which solution do you think is the best?