

SEETA HIGH SCHOOLS
END OF TERM ONE EXAMS 2019
S.4 MATHEMATICS PAPER 1
TIME: 2 ½ HOURS

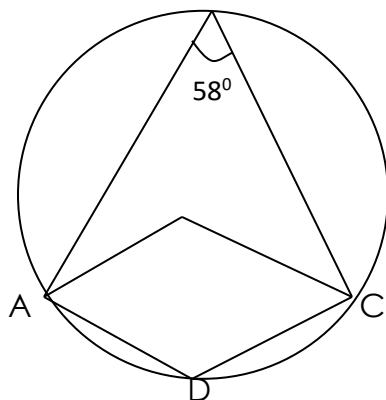
INSTRUCTIONS TO CANDIDATES:

- Attempt all questions in section A and not more than five questions from section B
- All necessary workings should be clearly shown
- Graph papers are provided
- Silent non-programmable scientific calculators may be used.

SECTION A (40 MINUTES)

1. Solve the equation
$$\frac{3}{4}(2y + 1) = \frac{5}{6}(y + 5)$$
 (4 marks)
2. Make P the subject of the formular
$$D = \sqrt{\frac{p}{q-p}}$$
 (4 marks)
3. The image of a point A(4,6) under an enlargement scale factor 0.5 is A'(2,3). Find the centre of enlargement. (4 marks)
4. Simplify the following expression to its simplest form
$$\frac{3(a+1)-2(a+4)}{a^2-25}$$
 (4 marks)
5. Given that $P = \begin{pmatrix} 2m-1 & 2 \\ -1 & m+2 \end{pmatrix}$ has no inverse, find the two possible values of m. (4 marks)
6. Solve the inequality and represent the solution on a number line
 $2x - 5(x-4) > 17$. (4 marks)
7. Given that $\tan \theta = \frac{5}{12}$ and $90^\circ < 360^\circ$, find $\cos \theta$ without using tables or calculators. (4 marks)

8. In the figure below O is the centre of the circle ABCD and angle ABC = 58°, calculate angle AOC and angle ADC.



9. Solve the pair of equations by matrix method $\frac{x}{5} - \frac{y}{4} = \frac{3}{4}$ and $\frac{x}{2} - \frac{y}{3} = 1$ (4 marks)
10. A bag contains Red, Blue and green pens, the probability of picking a red pen is $\frac{3}{10}$ and that for Blue is $\frac{1}{5}$. If there are 5 green pens. How many Red pens are in the bag? (4 marks)

SECTION B (60 MARKS)

Attempt any five questions from this section

11. (a) draw the graph of the curve $y = x^2 - 2x + 1$ for $-3 \leq x \leq 3$.
 (b) Use your graphs to find the solutions of the following equations
 (i) $x^2 - 2x + 1 = 0$
 (ii) $x^2 - x - 6 = 0$ (12 marks)
12. (a) Given that matrix $P = \begin{pmatrix} 4 & 1 \\ 2 & 3 \end{pmatrix}$, find p^2
 (b) find the matrix q such that $p^2 = 3p + q$
 (c) given the matrices $P = \begin{pmatrix} 2 & -1 \\ 4 & 3 \end{pmatrix}$, $Q = \begin{pmatrix} 1 & -2 \\ -2 & 5 \end{pmatrix}$ and that $R = PQ$, find the inverse of R . (12 marks)
13. Town B is 180km on a bearing of 050° from A. another town C is on bearing of 110° from town A and on a bearing of 150° from town B. town D is 240km on bearing of 320° from town A.
 (a) Draw a sketch diagram to show the position of the four towns

- (b) Calculate to the nearest kilometer
- The distance AC
 - The distance CD
- (12 marks)

14. The points $A(0,0)$, $B(-3,1)$, $C(1,3)$ and $D(4,2)$ are the vertices of a parallelogram an enlargement centre $(0,0)$ and scale factor -2

- Find the coordinates of $A'B'C'D'$
 - Draw $ABCD$ and $A'B'C'D'$ on the same grid
- The points $A''(0,0)$, $B''(6,2)$, $C''(2,6)$ and $D''(8,4)$ are the vertices of $A''B''C''D''$, the image of $ABCD$ under a transformation m . Find m and describe the matrix of transformation fully
- Find a single transformation T that maps $A'B'C'D'$ onto $A''B''C''D''$

15. The data below shows the weights of 50 patients admitted at a hospital in a certain week

Class	F
20-29	4
30-39	10
40-49	14
50-59	9
60-69	8
70-69	5

- Calculate
 - The mean value
 - The median value of the grouped data
- Draw a histogram and use it to estimate the mode. (12 marks)

16. A man started on a walk of 12km. after walking half the distance at $x \text{ kmh}^{-1}$ he reduced his speed by $\frac{1}{2} \text{ kmh}^{-1}$. If he had walked at $x \text{ km}^{-1}$ all the way, he would have called 10 minutes. Form an equation in x and solve it.

- Geoffrey is now 3 times as old as his daughter and 4 times as old as his son. 8 years from now Geoffrey's age will be 12 years more than the sum of the ages of his son and daughter. Find Geoffrey's present age. (12 marks)

17. (a) by shading the unwanted region, show the region that satisfies the following inequalities $5x-4y+16>0$, $4x+7y \geq 28$ and $3x+y \leq 21$.

(b) Calculate the area of the region that satisfies the above inequalities. (12 marks)

END