

U.S.OSTWAL ENGLISH ACADEMY (ICSE), MIRA RD SUMMATIVE ASSESSMENT-I (2019-20)

STD: X

MATHEMATICS

DATE: 23 /09 /2019

TIME: 2 1/2 hrs

MARKS: 80

SECTION A (Attempt all the questions)

Q1 a) If
$$\frac{8a-5b}{8c-5d} = \frac{8a+5b}{8c+5d}$$
, prove that $\frac{a}{b} = \frac{c}{d}$. (3)

b) If
$$A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$$
 and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$, find x and y when $A^2 = B$. (3)

$$1 + \sqrt{3} + 3 + 3\sqrt{3} + \dots$$

- i) Reflect A and B in the origin to get the images A' and B'.
- ii) Write the co-ordinates of A' and B'.
- iii) State the geometrical name for the figure ABA'B'.
- iv) Find its perimeter.
- c) The midpoint of the line segment joining (3 m, 6) and (-4, 3n) is (1, 2m -1). Find the values of m and n. (4)

b) Use ruler and compasses only for this question:

(3)

(3)

- i) Construct Triangle ABC, where AB = 3.5 cm, BC = 6 cm and ABC = 60°.
- ii) Construct the locus of points inside the triangle which are equidistant from BA and BC.
- iii) Construct the locus of points inside the triangle which are equidistant from B and C.
- iv) Mark the point P which is equidistant from AB, BC and also equidistant from B and C.

Measure and record the length of PB.

c) Construct a regular hexagon of side 4 cm. Construct a circle circumscribing the hexagon. (4)

Q4 a) Prove that:
$$\frac{\sin \theta - 2 \sin \theta}{-\cos \theta} = \tan \theta$$
 (3)

- b) An aeroplane at an altitude of 250m observes the angle of depression of two boats on the opposite banks of a river to be 45° and 60° respectively. Find the width of the river. Write the answer correct to the nearest whole number.
- c) 6 is the mean proportion between 2 numbers x and y and 48 is third proportion to x and y. Find the numbers. (4)

SECTION B (Attempt any four questions)

a) If
$$A = \begin{bmatrix} 5 & 7 \\ 2 & 4 \end{bmatrix}$$
, $B = \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix}$. (3)

b) In an AP the third term is 21 and the ninth term is 39. Find the sum of the first twelve terms.

Find: AB - 5C.

(3)



Find three terms in a G.P such that their product is 64 and their sum

(4)

a) Use graph paper for this question: Q6

(3)

- i) The point P (5,3) is reflected in the origin to get the image P'. Write down the co – ordinates of P'.
- ii) If M is the foot of the perpendicular from P to the x axis, Find the co- ordinates of M.
 - iii) If N is the foot of the perpendicular from P' to the x axis, Find the co-ordinates of N.
 - iv) Name the geometrical figure PMP'N.
- b) ABCD is a parallelogram whose vertices A, B and C have the co-ordinates (-3,2), (1,5) and (2, -4) respectively.

Find the co-ordinate of the fourth vertex.

(3)

c) For what value of 'a' lines 2x + ay = 5 and 5x - y + 1 = 0

(4)

ii) Perpendicular are: i) Parallel

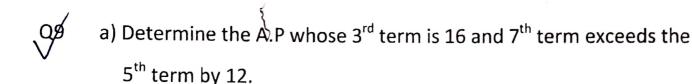
- a) A straight line AB is 8 cm long. Draw and describe the locus of a (3)point which is:
- i) always 4 cm from the line AB. ii) equidistant from A and B.
- b) Draw a circle of radius 3 cm. Mark a point P at a distance of 5 cm from the center of the circle drawn. Draw two tangents PA and PB to the given circle and measure the length of each tangents.

(3)

c) Prove that:
$$\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cos A} = \sin A + \cos A$$
 (4)

- a) The length of the shadow of a vertical tower on level ground Q8 increases by 10m, when the altitude of the sun changes from 45° to 30°. Calculate the height of the tower, correct to the two decimal places. (3)
 - b) What least number must be added to each of the numbers 6, 15, 20 and 43 to make them proportional. (3)

c) Let
$$A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}$$
, $B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$.
Find $A^2 + AC - 5B$.



(3)

b) Find the 8 th term of the geometric progression:

c) If the point P(-1, 2) divides the join of points A (2, 5) and B (a,b) in the ratio 3:4. Find the value of a x b – a. (4)

a) In triangle ABC, A (3,5), B (7,8) and C (1, -10) Find the equation of the median through A. $\begin{bmatrix} 2 & 3 & 4 \\ & 3 & 4 \end{bmatrix} \cdot \times = \begin{bmatrix} 1 & 1 \\ 2 & 3 & 4 \end{bmatrix}$ Q10 (3)

b) Construct a regular hexagon of side 5 cm. -(3)

c) Prove that:
$$\sqrt{\frac{1-\cos A}{1+\cos A}} = \frac{\sin A}{1+\cos A}$$
 (4)

- a) The length of the shadow of a vertical tower is stimes its height. 13 times Find the angle of elevation of the sun. (3)
- Find the 9th term of the series: 1, 4, 16, 64, b) (3)
- c) Construct a triangle ABC with BC = 6.5 cm, AB = 5.5 cm and AC = 5 cm. Construct the incircle of the triangle. (4)