



Octahedral classes, kharadi

2nd floor, yashwant plaza, near bank of India,

Class 10 - Mathematics

Prelim 1 Maths

Maximum Marks: 80

Time Allowed: 3 hours

Section A

1. Answer the following

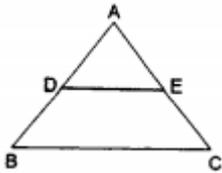
10

- Find the HCF and LCM of 6 and 20 using fundamental theorem of arithmetic.
- The HCF of 45 and 105 is 15. Write their LCM.
- After how many places will decimal expansion of $\frac{21}{24}$ terminate?
- Use Euclid's division algorithm to find the HCF of 196 and 38220
- Find the ratio between the LCM and HCF of 5, 15 and 20.
- Find the product of the zeroes of quadratic polynomial $x^2 - 3$.
- Find the value of 'k' such that the quadratic polynomial $x^2 - (k + 6)x + 2(2k + 1)$ has sum of the zeros is half of their product.
- If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - p(x + 1) - c$ such that $(\alpha + 1)(\beta + 1) = 0$, what is the value of c?
- $p(x) = ax^2 + bx + c$. If $a + b + c = 0$, then find one of its zero.
- Sum and product of zeroes of a quadratic polynomial are 0 and $\sqrt{15}$ respectively. Find the quadratic polynomial.

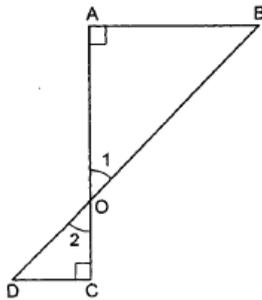
2. Answer the following

10

- D and E are points on the sides AB and AC respectively of a $\triangle ABC$. If $AD = 5.7$ cm, $DB = 9.5$ cm, $AE = 4.8$ cm and $EC = 8$ cm then determine whether $DE \parallel BC$ or not .



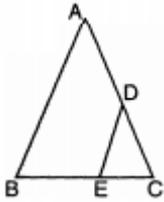
- In Fig. if $\angle A = \angle C$, then prove that $\triangle AOB \sim \triangle COD$.



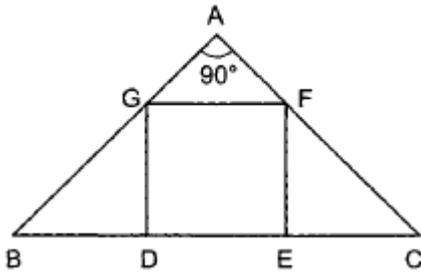
- $\triangle ABC$ and $\triangle DEF$ are similar and $AB = \frac{1}{3}DE$, then find $ar(\triangle ABC) : ar(\triangle DEF)$
- In $\triangle ABC$, if X and Y are points on AB and AC respectively such that $\frac{AX}{XB} = \frac{3}{4}$, $AY = 5$ and $YC = 9$, then state whether XY and BC are parallel or not.
-

In the figure of $\triangle ABC$, the points D and E are on the sides CA, CB respectively such that $DE \parallel AB$, AD

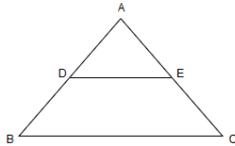
= 2x, DC = x + 3, BE = 2x - 1 and CE = x. Then, find x.



f) In Fig. DEFG is a square and $\angle BAC = 90^\circ$. Prove that $\triangle AGF \sim \triangle DBG$



g) In the given figure, $DE \parallel BC$. If $AD = 3$ cm, $DB = 4$ cm and $AE = 6$ cm, find EC.



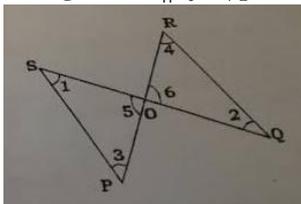
- h) In a certain distribution, mean and median are 9.5 and 10 respectively. Find the mode of the distribution, using an empirical formula.
 i) Which central tendency is obtained by the abscissa of point of intersection of less than type and more than type ogives?
 j) Find the mode of the given data: 3, 5, 7, 4, 5, 3, 5, 6, 8, 9, 5, 3, 5, 3, 6, 9, 7, 4.

Section B

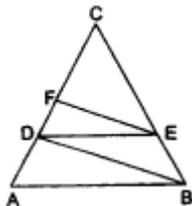
3. Answer any 6

12

- a) Without actual division, show that $\frac{24}{125}$ is a terminating decimal. Express the fraction in decimal form.
 b) Define HCF of two positive integers and find the HCF of 32 and 54
 c) If 2 and 3 are zeroes of polynomial $3x^2 - 2kx + 2m$, find the values of k and m.
 d) For what value of k, is -2 a zero of the polynomial $3x^2 + 4x + 2k$?
 e) In Fig. if $PS \parallel QR$, prove that $\triangle POS \sim \triangle ROQ$.



f) In the given figure, $AB \parallel DE$ and $BD \parallel EF$ Prove that $DC^2 = CF \times AC$.



- g) Find the combined mean of a group of 150, if the the value of mean of 50 students is 40 and that of other 100 students is 50.
 h) Write the lower limit of modal class of the data:

C. I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency	5	8	13	7	6

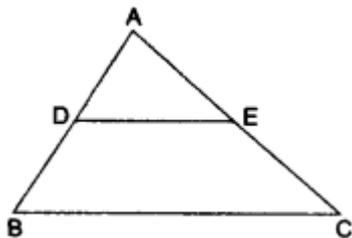
Section C

4. Answer any 8

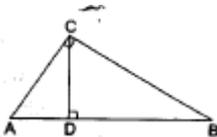
24

- a) Prove that $6 + \sqrt{2}$ is irrational.

- b) In $\triangle ABC$, D and E are the midpoints of AB and AC respectively. Find of the areas of $\triangle ADE$ and $\triangle ABC$.



- c) In the given figure, $\angle ACB = 90^\circ$ and $CD \perp AB$. prove that $\frac{BC^2}{AC^2} = \frac{BD}{AD}$.



- d) The vertical stick which is 15 cm long casts a 12-cm-long shadow on the ground. At the same time, a vertical tower casts a 50-m-long shadow on the ground. Find the height of the tower.
- e) Verify that 3, -1 and $-\frac{1}{3}$ are the zeros of the cubic polynomial $p(x) = 3x^3 - 5x^2 - 11x - 3$ and verify the relation between its zeros and coefficients.
- f) One zero of the polynomial $x^2 - 2x - (7p + 3)$ is -1, find the value of p and the other zero.
- g) Draw a line segment PQ = 8.4 cm. Using ruler and compass only, find the point R on PQ such that $PR = \frac{3}{4}RQ$.
- h) Draw a circle of radius 3.5 cm. Draw a pair of tangents to this circle which are inclined to each other at an angle of 60° . Write the steps of construction.
- i) Find the mean of the following frequency distribution, using the assumed-mean method:

Class	100 - 120	120 - 140	140 - 160	160 - 180	180 - 200
Frequency	10	20	30	15	5

- j) Find the mode of the following distribution:

Class Interval	10 - 14	14 - 18	18 - 22	22 - 26	26 - 30	30 - 34	34 - 38	38 - 42
Frequency	8	6	11	20	25	22	10	4

Section D

5. Answer any 6

24

- a) In a triangle $\triangle PQR$, N is a point on PR such that $QN \perp PR$. If $PN \times NR = QN^2$, then prove that $\angle PQR = 90^\circ$.
- b) In $\triangle ABC$, if $AD \perp BC$ and $AD^2 = BD \times DC$, prove that $\angle BAC = 90^\circ$.
- c) ABCD is a trapezium in which AB is parallel to DC and the diagonals AC, BD cut at X. A line is drawn through C parallel to DA to cut DB, produced if necessary at Y. Prove that:
- $\triangle AXD$, $\triangle BXC$ are equal in area
 - $\triangle AXD \sim \triangle CXY$
 - $\frac{XB}{XY} = \frac{XA^2}{XC^2}$
- d) Obtain all other zeroes of the polynomial $9x^4 - 6x^3 - 35x^2 + 24x - 4$, if two of its zeroes are 2 and -2.
- e) If the two zeroes of the polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$, find other zeroes.
- f) Draw "less than ogive" and "more than ogive" for the following distribution and hence find its median :

Class	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
Frequency	10	8	12	24	6	25	15

- g) Draw a circle of radius 3 cm. Take a point at a distance of 5.5 cm from the centre of the circle. From point P, draw two tangents to the circle.

