



Octahedral classes, kharadi
2nd floor, yashwant plaza, near bank of India,

Class 10 - Mathematics

Prelim 1 Maths

Maximum Marks: 80

Time Allowed: 3 hours

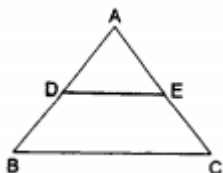
Section A

1. Answer the following 10

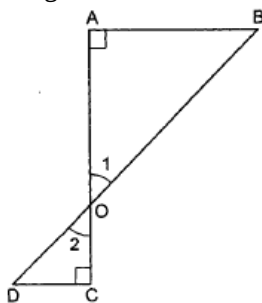
- a) Find the HCF and LCM of 6 and 20 using fundamental theorem of arithmetic.
- b) The HCF of 45 and 105 is 15. Write their LCM.
- c) After how many places will decimal expansion of $\frac{21}{24}$ terminate?
- d) Use Euclid's division algorithm to find the HCF of 196 and 38220
- e) Find the ratio between the LCM and HCF of 5, 15 and 20.
- f) Find the product of the zeroes of quadratic polynomial $x^2 - 3$.
- g) 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.
- h) 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?
- i) $p(x) = ax^2 + bx + c$. If $a + b + c = 0$, then find one of its zero.
- j) Sum and product of zeroes of a quadratic polynomial are 0 and $\sqrt{15}$ respectively. Find the quadratic polynomial.

2. Answer the following 10

- a) 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 .



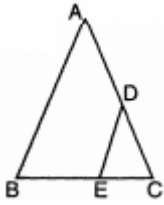
- b) In Fig. if $\angle A = \angle C$, then prove that $\triangle AOB \sim \triangle COD$.



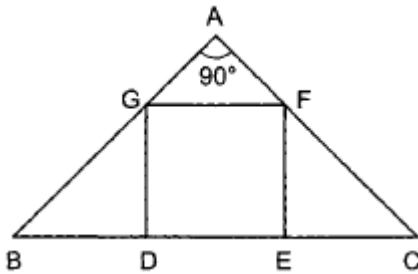
- c) $\triangle ABC$ and $\triangle DEF$ are similar and $AB = \frac{1}{3}DE$, then find $ar(\triangle ABC) : ar(\triangle DEF)$
- d) In $\triangle ABC$, if X and Y are points on AB and AC respectively such that $\frac{AX}{XB} = \frac{3}{4}$, $AY = 5$ and $YC = 9$, then state whether XY and BC are parallel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

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

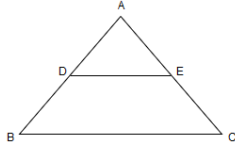
= 2x, DC = x + 3, BE = 2x - 1 and CE = x. Then, find x.



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.



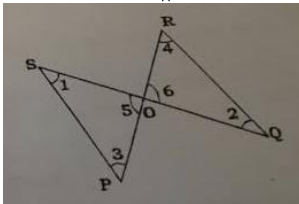
- In a certain distribution, mean and median are 9.5 and 10 respectively. Find the mode of the distribution, using an empirical formula.
- Which central tendency is obtained by the abscissa of point of intersection of less than type and more than type ogives?
- Find the mode of the given data: 3, 5,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

Section B

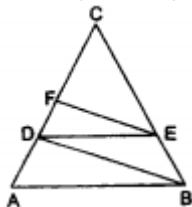
3. Answer any 6

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- Without actual division, show that $\frac{24}{125}$ is a terminating decimal. Express the fraction in decimal form.
- Define HCF of two positive integers and find the HCF of 32 and 54
- If 2 and 3 are zeroes of polynomial $3x^2 - 2kx + 2m$, find the values of k and m.
- For what value of k, is -2 a zero of the polynomial $3x^2 + 4x + 2k$?
- 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 $DC^2 = CF \times AC$.



- Find the combined mean of a group of 150, if the value of mean of 50 students is 40 and that of other 100 students is 50.
- 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

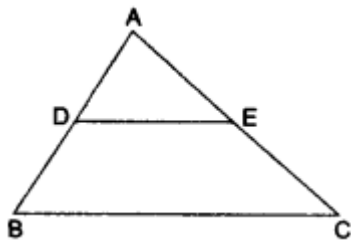
Section C

4. Answer any 8

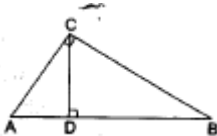
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- Prove that $6 + \sqrt{2}$ is irrational.

- 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

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- 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.

