

DAV PUBLIC SCHOOL (KAILASH HILLS)
FIRST TERMINAL EXAMINATION (CLASS X)
MATHEMATICS

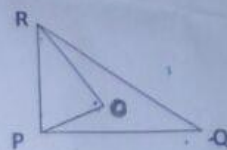
Time : 3 hours

Maximum Marks : 80

Instructions : All the questions are compulsory. Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each and Section D contains 8 questions of 4 marks each. Calculators are not allowed.

SECTION A

- 1 If the HCF of 22 and 46 is of the form $22m - 20$, then find m .
- 2 Find the zeroes of the polynomial $x^2 - 3$.
- 3 In the given figure O is a point inside ΔPQR , such that $\angle POR = 90^\circ$, $OP = 6$ cm, $OR = 8$ cm. If $QR = 26$ cm and $\angle QPR = 90^\circ$, then find PQ .
- 4 If $5 \tan \theta = 3$, then evaluate $(5 \sin \theta - 3 \cos \theta)$



 $(5 \sin \theta + 3 \cos \theta)$

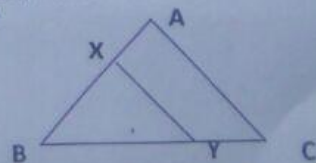
- 5 Find the value of k for which the quadratic equation $3x^2 + 2x + k = 0$ has real roots.
- 6 A die is thrown once. What is the probability that it shows a multiple of 3 greater than 4.

SECTION B

- 7 Evaluate : $2 \cos^2 60^\circ + 3 \sin^2 45^\circ - 3 \sin^2 30^\circ + 2 \cos^2 90^\circ$.
- 8 If $\sin 3A = \cos (A - 10^\circ)$, where $3A$ is an acute angle, then find the value of A .
- 9 Solve: $3\sqrt{7}x^2 + 4x - \sqrt{7} = 0$
- 10 If one zero of the polynomial $x^2 - 9x + 6k$ is twice the other, then find the value of k .
- 11 If the height of a tree is $3\sqrt{3}k$ metres and its shadow is of length $9k$ metres, then find the angle of elevation of the Sun at that time of the day.
- 12 Show that every positive odd integer is of the form $(4q + 1)$ or $(4q + 3)$ for some integer q .

SECTION C

- 13 Prove that $\sqrt{3}$ is an irrational number and hence $5 + \sqrt{3}$ is also an irrational number.
- 14 Find the zeroes of the quadratic polynomial $6x^2 - 7x - 3$ and verify relation between its zeroes and coefficients.
- 15 The sum of the squares of two odd positive numbers is 290, find the numbers.
- 16 In the given figure, the line segment $XY \parallel AC$ of ΔABC , and it divides the triangle into two parts of equal area. Prove that $AX : AB = (\sqrt{2} - 1) : \sqrt{2}$



- 17 Prove that the area of an equilateral triangle described on a side of a square is half the area of the equilateral triangle described on the diagonal of the same square.
- 18 From the top of a hill, the angles of depression of two consecutive km stones in the same direction are found to be 30° and 45° . Find the height of the hill. ($\sqrt{3} = 1.72$)
- 19 Prove that: $\sec\theta (1 - \sin\theta) (\sec\theta + \tan\theta) = 1$
- 20 Two coins are tossed simultaneously. Find the probability of getting
(i) Exactly one tail (ii) at most one head (iii) no tail
- 21 A card is drawn at random from a well shuffled deck of cards. Find the probability that the card drawn is
(i) a card of spades or an ace (ii) a face card
- 22 Calculate the mode of the following frequency distribution:

Class	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55
frequency	25	34	50	42	38	14

SECTION D

- 23 Prove that: $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$
- 24 If $x = r \sin\alpha \cos\beta$, $y = r \sin\alpha \sin\beta$ and $z = r \cos\alpha$ then prove that $r^2 = x^2 + y^2 + z^2$.
- 25 In an equilateral $\triangle ABC$, D is a point on the side BC such that $3BD = BC$.
Prove that $9AD^2 = 7AB^2$.
- 26 Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.
- 27 Solve: $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$
- 28 The angles of depression of the top and bottom of a building from the top of a 60 m high tower are 30° and 60° respectively. Find the height of the building.
- 29 The following data gives production yield per hectare of wheat of 100 farms of a village. Draw a 'more than type ogive' and also find the median using it.

Production yield (kg/hectare)	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70
Number of farms	5	7	14	19	30	25

- 30 The arithmetic mean of the following frequency distribution is 25. Find the value of p.

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
frequency	5	18	15	p	6
