

SECOND TERM EXAMINATION

MATHEMATICS

(Class X)

(Arithmetic progression, Triangles, Introduction to trigonometry,
Coordinate Geometry, Statistics)

Question Paper

SECTION-A

(10x1=10)

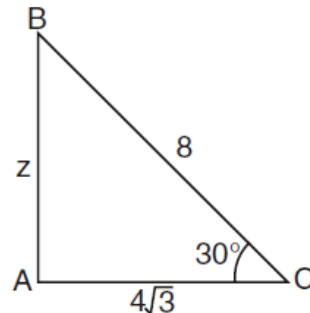
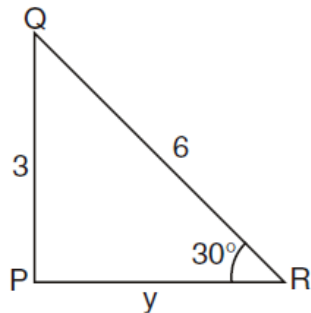
1) Which term of the A.P. 24, 21, 18, is the first negative term?

- (a) 8th (b) 9th (c) 10th (d) 12th

2) The distance between the points $(a \cos \theta + b \sin \theta, 0)$ and $(0, a \sin \theta - b \cos \theta)$ is:

- (a) $a^2 + b^2$ (b) $a + b$ (c) $a^2 - b^2$ (d) $\sqrt{a^2 + b^2}$

3) In the figure $\Delta ABC \sim \Delta PQR$, then $y + z$ is:

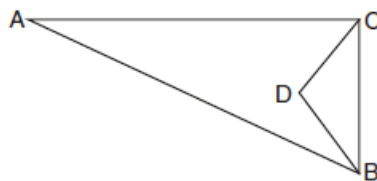


- a) $2 + \sqrt{3}$ b) $4 + 3\sqrt{3}$ c) $4 + \sqrt{3}$ d) $3 + 4\sqrt{3}$

4) The abscissa of the point of intersection of the less than type and of the more than type cumulative frequency curves of a grouped data give its:

- (a) mean (b) median (c) mode (d) all the three above

5) In the given figure, $\angle ACB = 90^\circ$, $\angle BDC = 90^\circ$, $CD = 4$ cm, $BD = 3$ cm, $AC = 12$ cm, $\cos A - \sin A$ is equal to:

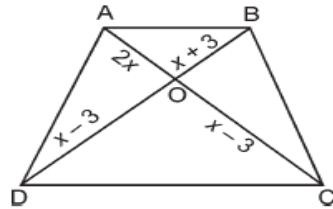


- a) $5/12$ b) $5/13$ c) $7/12$ d) $7/13$

6) If the numbers of $x - 2$, $4x - 1$, and $5x + 2$ are in A.P find the value of x .

7) If the centroid of the triangle formed by the points (a, b) , (b, c) and (c, a) is at the origin, then $a^3 + b^3 + c^3$ is equal to _____

8) In the given figure, if $AB \parallel CD$, find the value of x .



9) If $\tan 3x = \sin 45 \cos 45 + \sin 30$ then the value of x _____

10) ΔABC is such that $AB = 3$ cm, $BC = 2$ cm and $CA = 2.5$ cm. If $\Delta DEF \sim \Delta ABC$ and $EF = 4$ cm, then perimeter of ΔDEF is _____

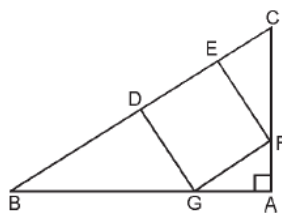
SECTION-B

(5x2=10)

11) The sum of first six terms of an A.P. is 42. The ratio of its 10th term to its 30th term is 1: 3. Calculate the first and the thirteenth terms of the A.P.

12) Find the coordinates of the centre of a circle passing through the points A (2, 1), B (5, -8) and C (2, -9).

13) In the figure, $DEFG$ is a square and $\angle BAC = 90^\circ$. Show that $DE^2 = BD \times EC$.



14) The following table shows the age distribution of cases a certain disease admitted during a year in particular hospital

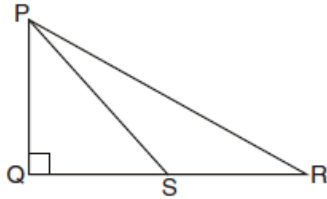
Age (Years)	5-14	15-24	25-34	35-44	45-54	55-64
No of Cases	6	11	21	23	14	5

15) If $\sin \theta + \cos \theta = \sqrt{2} \sin(90 - \theta)$, determine $\cot \theta$

16) If the median of the following data is 32.5, find the missing frequencies

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	x	5	9	12	y	3	2	40

17) In the figure, PQR is a right-angled triangle in which $Q = 90^\circ$. If $QS = SR$, show that $PR^2 = 4PS^2 = PQ^2$



18) If an A.P the sum of m terms is equal to n and the sum of n terms is equal to m , then prove that the sum of $(m+n)$ terms is $-(m+n)$

19) The mid-point P of the line segment joining the points $A (-10,4)$ and $B (-2,0)$ lies on the line segment joining the points $C (-9, -4)$ and $D (-4, y)$. Find the ratio in which P divides CD . Also, find the value of y

20) Find the acute angle θ when $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$

21) Without using trigonometry tables, evaluate the following

$$\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 2(\operatorname{cosec}^2 58^\circ - \tan^2 32^\circ) - 2\cot 58^\circ \tan 32^\circ - 4\tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$$

SECTION-D

(3x4=12)

22) Prove that a line drawn parallel to one side, to intersect the other sides in distinct points, divides the two sides in the same ratio.

23) If $1 + \sin^2 \theta = 3\sin\theta\cos\theta$, prove that $\tan\theta = 1$ and $\tan\theta = \frac{1}{2}$

24) Find the missing frequencies in the following distribution, if the sum of the frequencies is 120 and the mean is 50

Class	0-20	20-40	40-60	60-80	80-100
Frequency	17	F_1	32	F_2	19