



DELHI PUBLIC SCHOOL:: SURAT

MATHEMATICS

Roll No:
80

Class: X Marks:

Time Allowed: 3 hours

General Instructions :

- (i) The question paper comprises of **four Sections, A, B, C and D**. You are to attempt all the sections.
- (ii) **All** questions are **compulsory**.
- (iii) **All** questions of **Section-A, Section-B, Section-C and Section-D** are to be attempted separately.
- (iv) Question numbers **1 to 6** in **Section-A** are **one mark** questions.
- (v) Question numbers **7- 12** in **Section-B** are **two marks** questions.
- (vi) Question numbers **13 to 22** in **Section-C** are **three marks** questions.
- (vii) Question numbers **23 to 30** in **Section-D** are **four marks** questions.
- (viii) There is no overall choice. However, an internal choice has been provided in 4 questions of 3 marks each and 3 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

Section- A

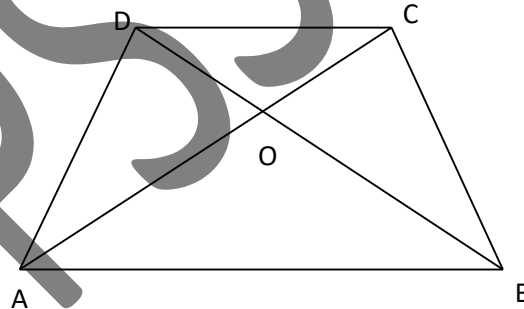
1. If 'p' and 'q' are two positive integers such that the least prime factor of 'p' is 5 and the least prime factor of 'q' is 7, then find least prime factor of 'p+q'.
2. If the root of the quadratic equation $x^2 + kx - \frac{5}{4} = 0$ is $\frac{1}{2}$, then find the value of k .
3. If the numbers $x - 2$, $4x - 1$ and $5x + 2$ are in AP, then find the value of x .
4. If $\Delta ABC \sim \Delta DEF$, $ar(ABC) = 400 \text{ cm}^2$, $ar(DEF) = 625 \text{ cm}^2$ and $DE = 5 \text{ cm}$, then find AB.
5. Find the distance between A $(-6, 10)$ and B $(-4, 6)$.
6. If $\tan(2x + 25^\circ) = 1$, then find the value of x .

Section- B

7. The LCM of two numbers is 3 times their HCF. The difference of LCM and HCF is 40. If one number is 240, then find the other number.
8. Is the system of linear equations $4x + 3y = 9$ and $8x + 6y - 18 = 0$ dependent? Justify your answer.
9. Find the sum of all natural numbers between 200 and 900 which are divisible by both 2 and 7.
10. Check whether $(a, b + c)$, $(b, c + a)$ and $(c, a + b)$ can be the vertices of any triangle or not.
11. Box A contains 30 marbles out of which 15 are blue and remaining are green. Box B contains 15 marbles out of which 7 are yellow and remaining are blue. Marbles of both the boxes are put into a big box C and one marble is selected at random. What is the probability that the selected marble is blue ?
12. A bag contains 25 balls of which x are red. If 5 more red balls are added to the bag, the probability of drawing a red ball is $\frac{2}{5}$, then find the value of x .
13. Show that $n^2 - 1$ is divisible by 8, if n is an odd positive integer.
14. If $x^4 + 7x^3 + 7x^2 + px + q$ is completely divisible by $x^2 + 7x + 12$, then find the value of p
15. Solve graphically and find the area enclosed by these two lines and y -axis.

$$4x - y = 4 \text{ and } 3x + 2y = 14$$

16. In the given figure, if $AB \parallel CD$, $DO = -5$, $CO = x + 1$, $BO = x - 4$, $AO = x + 3$, then find the value of x .



OR

Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

17. Find the ratio in which point $P(-1, y)$ lying on the line segment joining points $A(-3, 10)$ and $B(6, -8)$ divides it. Also find the value of y .

OR

In $\triangle ABC$, D, E and F are the mid-points of AB, AC and BC respectively. Find area of $\triangle ABC$ if A (0, -1), D (1,0) and E (0,1) are given.

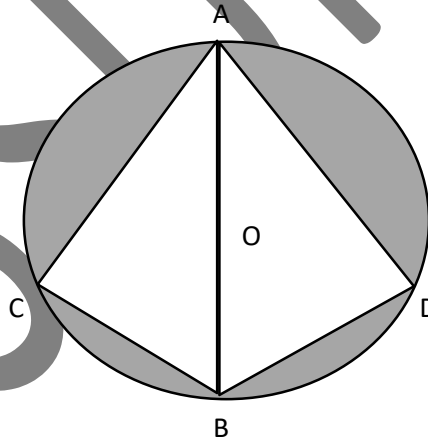
18. Evaluate:
$$\frac{2\cos^2 90^\circ + 4\cos^2 45^\circ + \tan^2 60^\circ + 3\operatorname{cosec}^2 60^\circ + 1}{3\sec 60^\circ - \frac{7}{2}\sec^2 45^\circ + 2\operatorname{cosec} 30^\circ - 1}$$

OR

Evaluate:

$$\frac{\sec^2(90^\circ - \theta) - \cot^2 \theta}{2(\sin^2 25^\circ + \sin^2 65^\circ)} + \frac{2\cos^2 60^\circ \tan^2 28^\circ \tan^2 62^\circ}{3(\sec^2 43^\circ - \cot^2 47^\circ)}$$

19. Two tangents PA and PB are drawn to a circle with centre O, such that $\angle APB = 120^\circ$. Prove that $OP = 2AP$.
20. Find the area of the shaded region in the given figure, if $BC = BD = 8$ cm, $AC = AD = 15$ cm and O is the centre of the circle.



21. A bucket is in the form of a frustum of a cone and it can hold 28.49 litres of water. If the radii of its circular ends are 28 cm and 21 cm, find the height of the bucket.

OR

A cylindrical glass tube with radius 10 cm has water upto a height of 9 cm. A metal cube of 8cm edge is immersed completely. By how much the water level will rise in the glass tube?

22. Draw both ogives for the given frequency distribution. Hence obtain the median.

Class intervals	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
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Frequency	2	12	2	4	3	4	3
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Section- D

23. A well of diameter 4 m is dug 21 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment.
24. An NGO sent food packets for flood victims in a motor boat whose speed is 24 km/h in still water takes 1 hr more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream. What moral value is depicted in this question?

OR

A man bought some books for orphan children for Rs. 80. If he had bought 4 more books for the same amount, each book would have cost Re. 1 less. Find the number of books he bought. What moral value is depicted in this question?

25. If S_n denotes the sum of first n terms of an AP, then prove that $S_{30} = 3(S_{20} - S_{10})$.
26. State and prove Thales theorem.

OR

P and Q are the mid-points on the sides CA and CB respectively of $\triangle ABC$ right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$

27. Prove that $(\sin\theta + \sec\theta)^2 + (\cos\theta + \operatorname{cosec}\theta)^2 = (1 + \sec\theta\operatorname{cosec}\theta)^2$
28. The angle of elevation of the top of a tower from certain point is 30° . If the observer moves 20m towards the tower, the angle of elevation of the top increases by 15° . Find the height of the tower.
29. Construct a triangle with sides 6.5 cm, 4.5 cm and included angle 60° and another similar triangle whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle.
30. The mean of the following data is 50. Find the missing frequencies f_1 and f_2 .

Class interval	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	Total
Frequency	17	f_1	32	f_2	19	120

OR

Find median and mode for the following data.

Classes	5 - 8	8 - 10	10 - 12	12 - 14	14 - 16	16 - 18
Frequency	60	50	70	150	80	90

END OF EXAMINATION