

**SAMPLE PAPER-1**  
**Mathematics**  
**Class - X**

Time 3 Hours

Maximum Marks: 80

General Instructions:

1. All Questions are compulsory.
2. The question paper consists of 25 questions divided into three sections; A, B, and C. Section A contains 7 questions of 2 marks each, section B is of 12 questions of 3 marks each and section C is of 6 questions of 5 marks each.
3. Internal choices have been provided in some questions. You have to attempt only one of the choices in such questions.
4. Write the serial number of the question before attempting it.
5. In question on construction the drawing should be neat and exactly as per the given measurements.
6. Use of calculator is not permitted. However you may ask for mathematical table.

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**SECTION-A**

1. Solve the equations

$$\frac{4}{x+y} + \frac{2}{x-y} = 2$$

$$\frac{8}{x+y} - \frac{2}{x-y} = 1$$

2. The sum to 20 terms of an AP is 1430 and the first term is 100. Find the last term.

**OR** Find the sum of all numbers between 400 and 600, which are divisible by 9.

3. Using quadratic formula, solve the following equation for x:

$$4x^2 + 4bx - (a^2 - b^2) = 0$$

**OR** A two-digit number such that the product of the digits is 14. When 45 is added to the number, the

digits are reversed. Find the numbers.

4. If one root of the equation  $x^2 - 5x + K = 0$  is equal to 4, find the value of K and the other root.

5. A typewriter is available for Rs.7,200 or for Rs.3,040 cash down payment and five equal monthly

installments of Rs.860 each. Find the rate of interest under the installment scheme.

6. A loan has to be returned in two equal annual installments. If the rate of interest is 16% per annum

compounded annually and each installment is Rs1,682, find the sum borrowed and the total interest

charged.

7. Derive the formula for the sum of first n terms of an A.P whose first term is a and the common difference

is d

**OR** If m times the m th term of an A.P is equal to n times its n th term, show that the (m+n)th term of the

A.P is 0

### **SECTION-B**

8. Prove that the line-segment joining the points of contact of two parallel tangents to a circle is a diameter of

the circle.

9. If the bisector of an angle of a triangle bisects the opposite side, prove that triangle is isosceles.

10. Reduce the following rational expression to its lowest terms

$$\frac{4(a^2 + a - 2)}{6(a^3 + 2a^2 - a - 2)}$$

11. Solve the system of equations graphically:

$3x + y - 5 = 0$ ,  $2x - y - 5 = 0$ . Also, find the points where these lines meet the y- axis.

12. Show that the midpoint of the line-segment joining the points (5,7) and (3,9) is also the mid-point of the

line segment joining the points (8,6) and (0, 10).

13. Prove that the points (3,1) , (8,1), (4,4) and (-1, 4) are the vertices of a rhombus.

14. Find the mean marks from the following data:

Marks	No. of Students
Below 10	5
Below 20	9
Below 30	17
Below 40	29
Below 50	45
Below 60	60
Below 70	70
Below 80	78
Below 90	83
Below 100	85

15. In the month of July 2004, a household spent his monthly salary amounting to Rs.7,200 on different

items as given below

Clothing	Rs 600
Food	Rs 4000
House rent	Rs 1200
Miscellaneous	Rs 1000

Represent the information in the form of a pie chart.

16. 50 circular plates, each of radius 7cm and thickness  $\frac{1}{2}$  cm, are placed one above another to form a solid

right circular cylinder. Find the total surface area and the volume of the cylinder so formed.

17. Construct a triangle ABC whose sides are 7.5 cm, 7 cm and 6.5 cm. Construct another triangle similar to

triangle ABC with sides  $\frac{2}{3}$  rd of the corresponding sides of the triangle ABC.

18. Prove that :  $\sin^8 A - \cos^8 A = (\sin^2 A - \cos^2 A) (1 - 2 \sin^2 A \cos^2 A)$

**OR**

Evaluate:  $\operatorname{cosec} (65^\circ + A) \sec (25^\circ - A) - \tan (55^\circ - A) + \cot (35^\circ + A) + \cos (40^\circ + A) - \sin (50^\circ - A)$

$$+ \frac{\cos 55^\circ \operatorname{cosec} 35^\circ}{\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ}$$

19. A bag contains 12 balls out of which x are white.

If one ball is drawn at random, what is the probability of drawing a white ball ?

i) If 6 more white balls are put in the bag, the probability of drawing a white ball will be double than that in (i). Find x.

### SECTION-C

20. The annual income of Ali is Rs. 1,15,000. He wants complete exemption from payment of income tax. How much (minimum) should he contribute towards his PF per month so that he is not liable to pay any tax? Assume the following for calculating income tax:

**a) Standard deduction:**  $\frac{1}{3}$  rd of total annual income subject to a maximum of Rs 30,000, if

income is less than Rs 1, 50, 000 and Rs 25,000 in case the annual

income is between Rs. 1, 50,000 and Rs. 3, 00, 000

**b) Rate of Income tax**

#### **Slab**

#### **Income Tax**

i) Upto Rs. 5,000	No Tax
ii) From Rs50, 001 to Rs. 60,000 50,000	10% of the amount exceeding Rs.
iii) Rs. 60001 to 1,50,000 exceeding Rs. 60,000.	Rs. 1000 + 20% of the amount
iv) Above Rs. 1,50,000 exceeding Rs. 1,50,000.	Rs. 19000 + 30% of the amount

- c) **Rebate in income tax** i) 20% of the total savings subject to a maximum of Rs. 14,000, if taxable income is up to Rs. 1,50,000
- ii) 15% of the amount of saving subject to a maximum of Rs. 10,500 if taxable income is above Rs. 1,50,000.

d) **Surcharge** 5% of the total tax payable (after rebate)

21. If a chord is drawn through the point of contact of a tangent to a circle, then the angles which this chord makes with the given tangent are equal respectively to the angles formed in the corresponding alternate segments. Prove it.

Using the above theorem, prove that following:

If ABC is an isosceles triangle with  $AB = AC$ , Prove that the tangent at A to the circumcircle of  $\Delta$

ABC is parallel to BC.

**OR** If two chords of a circle intersect internally or externally, then the product of the lengths of their segments are equal.

b) Two chords AB and CD of a circle intersect each other at P outside the circle. If  $AP = 5$  cm,  $BP = 3$  cm and  $PD = 2$  cm, find CD.

22. Prove the ratio of the areas of similar triangles is equal to the ratio of the squares of their corresponding sides.

Using it prove: ABCD is a trapezium with  $AB \parallel DC$ . If  $\Delta AED \sim \Delta BEC$ , prove that  $AD = BC$ .

23. A right triangle with sides 3 cm and 4 cm is resolved around its hypotenuse. Find the volume of the double cone thus generated

**OR** A cylindrical bucket, 32 cm high and 18 cm of radius of the base, is filled with sand. The bucket is

emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm,

find the radius and slant height of the heap

24. The angle of elevation of a cloud from a point 60 m above a lake is  $30^\circ$  and the angle of depression of the reflection of cloud in the lake is  $60^\circ$ . Find the height of the cloud.

**OR** From the top of a tower 50m high the angles of depression of the top and bottom of a pole are

observed to be  $45^\circ$  and  $60^\circ$  respectively. Find the height of the pole; the pole and the tower stand in the same plane.

25. The mean of the following table is 50, but the frequencies  $f_1$  and  $f_2$  in classes 20-40 and 60-80

respectively are not known. Find their frequencies

Class:	0-20	20-40	40-60	60-80	80-100	total
Frequency:	17	$f_1$	32	$f_2$	19	120