Class –X

Mathematics

Section – 'A' (carry one mark each)

GENERAL INSTRUCTIONS:

1. All questions are compulsory.
2. The question paper consists of thirty four questions divided into four sections A, B, C & D. Section A comprises of ten questions of 01 marks each, Section B comprises of eight questions of 02 marks each, Section C comprises of ten questions of 03 marks each and section D comprises of six questions of 04 marks each.
3. All questions in section A are multiple choice questions where you are to select one correct option out of given four.
4. There is no overall choice. However internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 04 mark each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

---

1. If the factorization of the denominator of $\frac{23}{2^2 \times 5^2}$, then it can be ;
   a) Non -terminating and non- repeating decimal expansion.
   b) Terminating and non-repeating decimal expansion.
   c) Terminating and repeating decimal expansion.
   d) None of these.

2. From the given graph, the required quadratic polynomial is:

   (a) x^2+4x-5
   (b) x^2-4x+5

   (c) x^2-4x-5
   (d) x^2-x+5
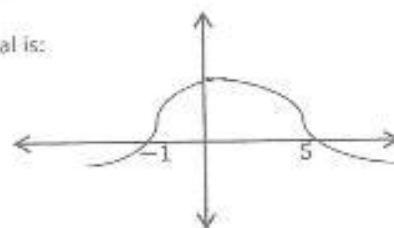
3. In $\triangle ABC$, DE||BC intersecting AB at D and AC at E, $AD = 1cm$, $DB = 3cm$, $AE = 1.5cm$, then AC is
   a) 6cm   b) 10cm   c) 8cm   d) none of these

4. If $cos(35° + X) = sin 30°$, then what is the value of X is
   a) 15°   b) -5°
   c) 25°   d) -25°

### "Chase Excellence- Success Will Follow"

5. If $2\cos3\theta = 1$, then the value of θ is
   a) $25°$ b) $20°$ c) $15°$ d) $19.5°$

6. If $3\tan\theta = 4$, then the value of $\dfrac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$ is
   a) $\dfrac{11}{26}$ b) $\dfrac{13}{26}$ c) $\dfrac{21}{26}$ d) $\dfrac{17}{26}$

7. The value of y and x when 0.56 is expressed in the form of $\dfrac{a}{2^y \times 5^x}$ is
   a) y=1, x=2   b) y=0,x=2   c) y=2, x=0   d) y=2, x=2

8. the pair of equations x=a, y=b graphically represent lines which are
   a) parallel   b) intersecting at (a, b)   c) coincident   d) intersecting at (b, a)

9. $\dfrac{2\cos67°}{\sin23°} - \dfrac{\tan40°}{\cot50°} - \cos0°=?$
   a) Zero   b) -1   c) 1   d) 2

10. What is the mean of the data with mode 21 and median 27?
    a) 30   b) 60   c) 48   d) 06

Section – 'B' (carry two marks each)

11. Why 15^n cannot end with 0?

12. Find the quotient & remainder when $t^5 + 5t^3 + 3t^2 + 5t + 3$ is divided by $t^2 + 4t + 2$

13. Solve for x & y:
    $$4x + \frac{y}{3} = \frac{8}{3} \; ; \; \frac{x}{2} + \frac{3y}{4} = -\frac{5}{2}$$

14. Find: $3\left(\dfrac{\sin36°}{\cos54°}\right)^2 - 2\left(\dfrac{\tan18°}{\cot72°}\right)^3 + 2\tan13°\tan21°\tan69°\tan77°$

    Or

    If $\cos\alpha = \dfrac{1}{2}$ and $\tan\beta = \dfrac{1}{\sqrt{3}}$, find the value of $\sin(\alpha + \beta)$ where α, β are the acute angles.

15.

In the given fig., AB $\perp$ BC, DC $\perp$ BC & DE $\perp$ AC,
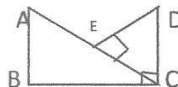
Prove that: $\triangle CED \sim \triangle ABC$.

16. D, E, F are the mid-points of side BC, CA & AB respectively of a $\triangle ABC$. Determine the ratio of the areas of $\triangle DEF$ & $\triangle ABC$.

17. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in Kg/ha)	No. of farms.
50 − 55	2
55 − 60	8
60 − 65	12
65 − 70	24
70 − 75	38
75 − 80	16

Change the distribution to a more than type distribution.

18. If the mean of the following frequency distribution is 8, find the value of p.

X	3	5	7	9	11	13
Y	6	8	15	p	8	4

Section – 'C' (carry three marks each)

19. Rima has 2 ribbons which are 80cm & 96cm long. She has to cut them in equal pieces to make bows. What is the length of the largest of the longest piece of ribbon that she can cut, so that no ribbon is wasted?

20. Show that $5 - 3\sqrt{2}$ is an irrational number.

    Or

    Use Euclid's algorithm to find the HCF of 56, 96 and 404

21. The sum of the digits of two digit number is 15. The no. obtained by interchanging the digits exceeds the given no. by 9. Find the number.

    Or

    A part of monthly expenses of a family is constant & the remaining varies with the price of wheat. When the rate of wheat is Rs. 250 a quintal, the total monthly expenses of the family are Rs. 1000 & when it is Rs. 240 a quintal, the total monthly expenses are Rs. 980. Find the total monthly expenses of the family when the cost of wheat is Rs. 350 a quintal.

22. p, q are the zeroes of polynomial $x^2 - (k + 6)x + 2(2k - 1)$. Find the value of k if $p + q = \frac{1}{2} p.q$.

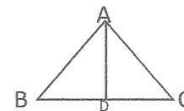23. Prove that: $tan^2 A + cot^2 A + 2 = sec^2 A \, cosec^2 A$

24. Prove that: $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$

25. In an equilateral ∆ABC, AD ⊥ BC, prove that $3AB^2 = 4AD^2$

26.

In the adjoining figure, AD ⊥ BC & $\frac{BD}{DA} = \frac{DA}{DC}$.

Prove that ∆ABC is a right ∆.

27. Find the missing frequencies and the median if the mean is 1.46.

No. of accidents	0	1	2	3	4	5	Total
Frequency (No. of days)	46	?	?	25	10	5	200

"Chase Excellence- Success Will Follow"

28. The median of the following data is 32.5. find x and y.

Class Interval	Frequency
0 − 10	x
10 − 20	5
20 − 30	9
30 − 40	12
40 − 50	y
50 − 60	3
60 − 70	2
	$Total = 40$

Section – 'D' (carry four marks each)

29. Obtain all the zeroes of the polynomial $x^4 − 7x3 + 17x^2 − 17x + 6$. If two of its zeroes are 3 & 1.

30. Prove that the area of the equilateral Δ described on the side of a square is half the area of equilateral Δ described on its diagonals.

Or

Prove that the areas of two similar Δ's are in the ratio of the squares of the corresponding altitudes.

31. Prove that: $\dfrac{\sin A + \cos A}{\sin A − \cos A} + \dfrac{\sin A − \cos A}{\sin A + \cos A} = \dfrac{2}{2\sin^2 A − 1} = \dfrac{2}{1 − 2\cos^2 A}$

Or

If $x\sin^3 \theta + y\cos^3 \theta = \sin \theta \cos \theta$ and $x\sin \theta = y\cos \theta$ prove $x^2 + y^2 = 1$

32.
   a) If $\tan (A + B) = 1$ and $\sin (2A − B) = 1$, find A and B.
   b) If $\sin 3\theta = \cos (\theta − 6°)$ where 3θ and $\theta − 6°$ are acute angles, find θ.

33. Draw the graph of the system of equations $x + y = 5$ & $2x − y = 2 = 0$. Shade the region bounded by these lines & the x-axis. Find the area of the shaded region.

34. During the medical check up of 35 students of a class their weights. Are recorded as follows:

Weights (in Kg)	No. of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than type Ogive for the given data. Hence obtain the median weight from the graph and verify the result by using the formula.