Sample Paper – 2014
Class – X
Subject – Mathematics

From this semester there is little change in pattern.

So students are advised to have sufficient practice & be quick to your answers.

Section A has 4 questions of 1 mark each…….. (4 x 1)

Section A has 6 questions of 2 mark each………(6 x 1)

Section A has 10 questions of 3 mark each…… (10 x 1)

Section A has 11 questions of 4 mark each…….(11 x 1)

Section - A

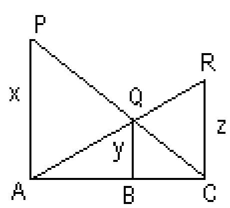
1. For what possible value of n, $a^{2n}-b^{2n}$ is divisible by a-b.
2. (i) The graph of x=0 is ______.
   (ii)The equation of x-axis is _______.
3. The algebraic sum of the deviations of a frequency distribution from its mean is (a) 0 (b) always positive (c) always negative (d) a non-zero number.
4. ABC is a right triangle right angled at C. D is the mid-point of BC. $\angle ABC=\theta$, $\angle ADC=\phi$ Show that $\frac{\tan\theta}{\tan\phi}=\frac{1}{2}$.

Section -**B**

5. $\alpha \& \frac{1}{\alpha}$ are the zeros of the polynomial $4x^2-2x+(k-4)$. Find the value of 'k'.
6. In ΔABC, $\angle B=2\angle C$ & the bisector of $\angle B$ intersects AC at D. Prove that $\frac{BD}{DA}=\frac{BC}{BA}$.
7. If 5x=Sec θ & $\frac{5}{x}=\tan\theta$ find $5\left(x^2-\frac{1}{x^2}\right)$
8. If $\sqrt{3}\cot^2\theta-4\cot\theta+\sqrt{3}=0$ then find the value of $\cot^2\theta+\tan^2\theta$.
9. If two numbers are in the ratio 3:4 & their HCF is 6. Find the numbers & their LCM.
10. Prove that $\sec^2\theta+\mathrm{cosec}^2\theta$ can never be less than 2.

Section –C

11. A rectangular field is 150mx60m. Two cyclists A & R start together & can cycle at speed of 21m/min. & 28 m/min, respectively. They cycle along the rectangular track, around the field from the same point & at the same movement. After how many minutes will they meet again at the starting point?
12. If α, β are the zeros of the quadratic polynomial $p(s) = 3s^2 - 6s + 4$, find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} + 2\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) + 3\alpha\beta$.
13. A jeweler has bars of 18-carat gold & 12-carat gold. How much of each must be melted together to obtain a bar of 16-carat gold, weighing 120 gm.
14. Solve for ‘p’ & ‘q’ $2^p + 3^q = 17 \quad 2^{p+2} - 3^{q+1} = 5$.
15. If $aSin\theta + bCos\theta = c$ Prove that $aCos\theta - bSin\theta = \sqrt{a^2 + b^2 - c^2}$.
16. PA, QB & RC are each ⊥ to AC. Prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$.

a. 

17. The mean of 8 observations is 4.5 & the mean of another 4 observations is 6. Find the mean of another 12 observations.
18. (i)A group of 10 items has arithmetic mean 6. If the arithmetic mean of 4 of these items is 7.5, find the mean of the remaining items.
(ii)Given Mean=31.04 & Median=30.625 of a frequency distribution, find mode of this distribution.
19. 6 bells commence tolling together & toll at intervals of 2, 4, 6, 8, 10 & 12 sec, respectively. In 30 min, how many times do they toll together?
20. Find the greatest 6-digit number which is completely divisible by 30, 40 & 50.

Section –D

21. A men sold a chair and a table together for ₹Rs 1520 thereby making a profit of 25% on the chair and 10% on the table. By selling them together for ₹Rs 1535, he would have made a profit of 10% on the chair and 25% on the table. Find the cost price of each.
22. If one zero of the polynomial $ax^2 + bx + c$ is triple of the other, then show that $3b^2 = 16ac$.
23. In any Δ ABC prove that tan $\tan\frac{A+B-C}{2} = \cot C$.
24. Prove that : $2(Sin^6\theta + Cos^6\theta) - 3(Sin^4\theta + Cos^4\theta) + 1 = 0$

25. $3Sin\theta + 5Cos\theta = 5$ Prove that $5Sin\theta - 3Cos\theta = \pm 3$

26. P &Q respectively are mid-points of the sides CA & CB of a right triangle ABC, right angled at C. Prove that (i) $4AQ^2 = 4AC^2 + BC^2$ (ii) $4BP^2 = 4BC^2 + AC^2$ (iii) $4(AQ^2 + BP^2) = 5AB^2$.

27. Prove that the sum of squares of diagonals of parallelogram is equal to the sum of squares of sides of parallelogram.

28. Prove that : $\dfrac{1 - Sec^4\theta - Tan^4\theta}{1 - Sec^2\theta} = 2Sec^2\theta$

29. The median of the data is 525. Find f_1 & f_2 if the sum of frequencies is 100.

Class	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	f_1	12	17	20	F_2	9	7	4

30. If (n-k) is a factor of the polynomials x^2+px+q & x^2 + m x+n. Prove that k = n + $\dfrac{n-q}{m-p}$

31. Prove that three times the sum of the squares of the sides of a triangle is equal to four times the sum of the squares of the medians of the triangle.

Extra questions

32. If 7 cosecφ-3cotφ = 7, prove that 7cotφ - 3cosecφ = 3.
33. If Secφ+Tanφ=4 find sin φ, cosφ

34. A's present age to the B's present age is 7 : 9. 12 years ago, their ages were in the ratio 3:5. When would the ratio of the ages be 6 : 7. (Solve using two variables)

35. Prove that $\sum(x_i - \bar{x}) = 0$

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