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PREMIER INSTITUTE for X , XI & XII .

General Instructions :

1. All questions are compulsory.
2. The question paper consists of 34 questions divided into four sections A,B,C and D. Section – A comprises of 10 question of 1 mark each. Section – B comprises of 8 questions of 2 marks each. Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 6 questions of 4 marks each.
3. Question numbers 1 to 10 in Sections – A are multiple choice questions where you are to select one correct option out of the given four.
4. There is no overall choice. However, internal choice has been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four mark each. You have to attempt only one lf the alternatives in all such questions.
5. Use of calculator is not permitted.

# SET 'R' CLASS X _ 2011-2012 (SA-1)

**Time : 3 Hours 15 Minutes** **Maximum Marks : 80**

## SECTION A

**Q.1** The lengths of the diagonals of a rhombus are 24 cm and 32 cm. The perimeter of the rhombus is :
(A) 9 cm (B) 128 cm (C) 80 cm (D) 56 cm

**Q.2** The $[HCF \times LCM]$ for the numbers 50 and 20 is
(A) 10 (B) 100 (C) 1000 (D) 50

**Q.3** The value of k for which the pair of linear equations $4x+6y-1=0$ and $2x+ky-7=0$ represents parallel lines is
(A) k =3 (B) k = 2 (C) k = 4 (D) k= -2

**Q.4** If one of the zeroes of the quadratic polynomial ( k – 1) $x^2+kx+1$ is (-3) then k equals to
(a) $\frac{4}{3}$ (b) $-\frac{4}{3}$ (c) $\frac{2}{3}$ (d) - $\frac{2}{3}$

**Q.5** The value of $\frac{2\tan 30^0}{1-\tan^2 30^0}$ equal to
(a) $\cos 60^0$ (b) $\sin 60^0$ (c) $\tan 60^0$ (d) $\sin 30^0$

**Q.6** Which of the following numbers has terminating decimal expansion ?
(a) $\frac{37}{45}$ (b) $\frac{21}{2^3 5^6}$ (c) $\frac{17}{49}$ (d) $\frac{89}{2^2 3^2}$

**Q.7** $\sin(60+\theta)-\cos(30^0-\theta)$ is equal to
(a) $2\cos\theta$ (b) $2\sin\theta$ (c) 0 (d) 1

**Q.8** The value of $[(\sec A+\tan A)(1-\sin A)]$ is equal to
(a) $\tan^2 A$ (b) $\sin^2 A$ (c) cos A (d) sin A

**Q.9** If $\sin A+\sin^2 A=1$, then the value of $\cos^2 A+\cos^4 A$ is
(a) 2 (b) 1 (c) -2 (d) 0

**Q.10** In fig. 1 the value of the median of the data using the graph of less than ogive and more than ogive is

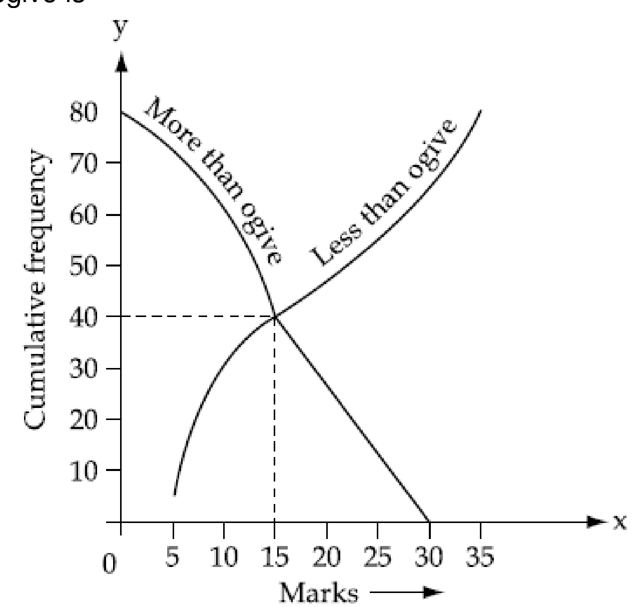


Figure 1



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(a) 5 (b) 40 (c) 80 (d) 15

## SECTION B

**Q.11** In fig.2, A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $AC \parallel PR$. Show that $BC \parallel QR$.

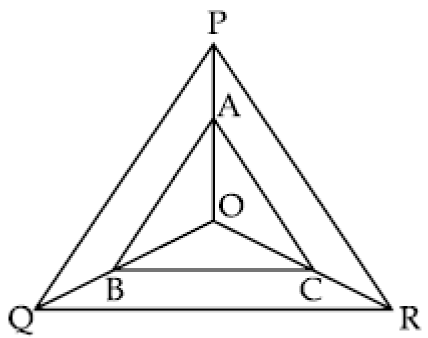

Fig. 2

**Q.12** If $\sec 4A = \operatorname{cosec}(A - 20^0)$ where 4A is an acute angle, find the value of A.

OR

If $5\tan\theta = 4$, find the value of $\dfrac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$.

**Q.13** In figure 3, ABCD is a parallelogram. Find the values of x and y.

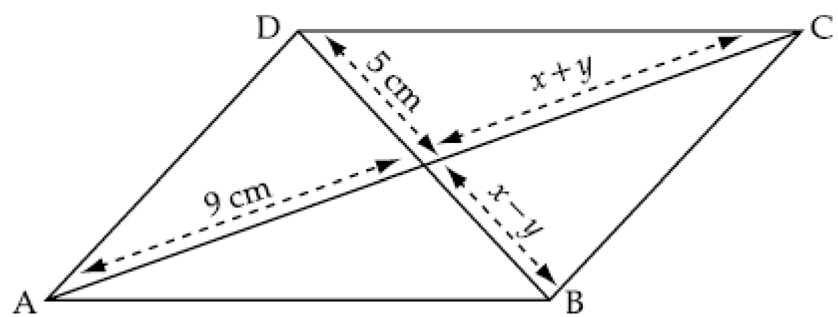

Figure 3

**Q.14** In figure 4, Two triangles ABC and DBC are on the same base BC in which $\angle A = \angle D = 90^0$ if CA and BD meet each other at E, show that $AE \times CE = BE \times DE$

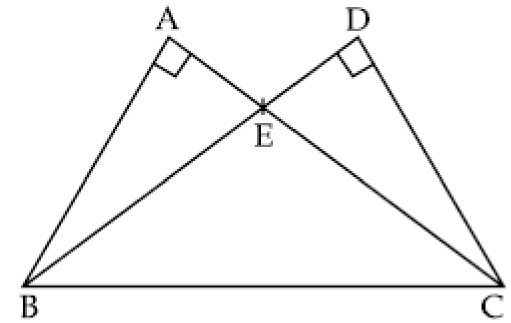

Figure 4

**Q.15** If $\alpha$ and $\beta$ are the zeroes of $x^2 + 7x + 12$ then find the value of $\dfrac{1}{\alpha} + \dfrac{1}{\beta} - 2\alpha\beta$

**Q.16** Convert the given cumulative frequency table into frequency distribution table :

| Marks | Number of students |
|---|---|
| 0 and above | 120 |
| 20 and above | 108 |
| 40 and above | 90 |
| 60 and above | 75 |
| 80 and above | 50 |
| 100 and above | 24 |
| 120 and above | 9 |
| 140 and above | 0 |

**Q.17** Find the mode of the following data :

| Class | 0 - 20 | 20 - 40 | 40 - 60 | 60 - 80 |
|---|---|---|---|---|
| Frequency | 15 | 6 | 18 | 10 |



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**Q.18** Check whether $6^n$ can end with the digit O for any natural number n ?

## SECTION C

**Q.19** If $\alpha$ and $\beta$ are zeroes of the quadratic polynomial $x^2 - 6x + a$; find the value of .a. if $3\alpha + 2\beta$ =20.

**Q.20** Find HCF of 180, 252 and 324 using Euclid.s Division Lemma.

**Q.21** Prove that $\sqrt{7}$ is an irrational number.

OR

Prove that $3+\sqrt{5}$ is an irrational number.

**Q.22** Prove that $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = (\frac{1+\sin\theta}{\cos\theta})^2$ .

**Q.23** In $\Delta$ABC, in fig. 5 , a PQ meets AB in P and AC in Q. If AP = 1cm, PB= 3cm, AQ=1.5 cm
QC=4.5 cm, prove that area of $\Delta APQ$ is one sixteenth of the area of $\Delta ABC$ .

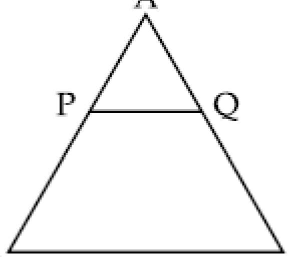


Fig. 5

**Q.24** In figure 6 , P and Q are the midpoints of the sides CA and CB respectively of $\Delta ABC$ right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$

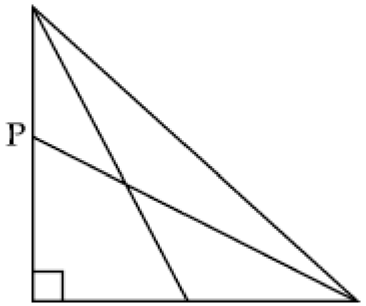


Figure 6

**Q.25** The sum of digits of a two digit number is 15. The number obtained by interchanging the digits exceeds the given number by 9. Find the number.

OR

Solve for *x* and *y* :

$\frac{x}{a} + \frac{y}{b} = 2$

$ax - by = a^2 - b^2$

**Q.26** The mean of the following frequency distribution is 50. Find the value of P.

| Classes | 0 - 20 | 20 - 40 | 40 - 60 | 60 - 80 | 80 - 100 |
|---|---|---|---|---|---|
| Frequency | 17 | 28 | 32 | P | 19 |

**Q.27** Find the mean of the following data :

| Classes | 25 - 30 | 30 - 35 | 35 - 40 | 40 - 45 | 45 - 50 | 50 - 55 | 55 - 60 |
|---|---|---|---|---|---|---|---|
| Frequency | 14 | 22 | 16 | 6 | 5 | 3 | 4 |

OR

Find the median of the following data :


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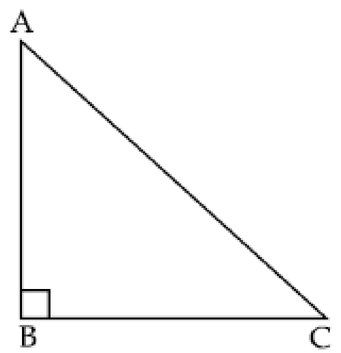
| Marks | Number of students |
|---|---|
| 0 and above | 80 |
| 10 and above | 77 |
| 20 and above | 72 |
| 30 and above | 65 |
| 40 and above | 55 |
| 50 and above | 43 |
| 60 and above | 28 |
| 70 and above | 16 |
| 80 and above | 10 |
| 90 and above | 8 |
| 100 and above | 0 |

**Q.28** In figure 7, $\Delta ABC$ is right angled at B, BC=7cm and AC – AB = 1cm .Find the value of




$\cos A - \sin A$ Figure 7 .

## SECTION D

**Q.29** Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares
of the other two sides.

**OR**

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

**Q.30** Without using trigonometric tables, evaluate the following :

$$\frac{\cos^2 20^0 + \cos^2 70^0}{\sec^2 50^0 - \cot^2 40^0} + 2\operatorname{cosec}^2 58^0 - 2\cot 58^0 \tan 32^0 - 4\tan 13^0 \tan 37^0 \tan 45^0 \tan 53^0 \tan 77^0$$

OR

Prove that : $\dfrac{\sin A}{\sec A + \tan A - 1} + \dfrac{\cos A}{\operatorname{cosec} A + \cot A - 1} = 1.$

**Q.31** What must be added to the polynomial $f(x) = x^4 + 2x^3 - 2x^2 + x - 1$ so that the resulting polynomial is exactly divisible by $x^2 + 2x - 3$ .

**Q.32** Check graphically whether the pair of linear equations $4x - y - 8 = 0$ and 2x – 3y + 6 = 0 is consistent. Also, find the vertices of the triangle formed by these lines with the x-axis.

**Q.33** If $2\cos\theta - \sin\theta = x$ and $\cos\theta - 3\sin\theta = y$. Prove that $2x^2 + y^2 - 2xy = 5$

**Q.34** Draw a less than ogive for the following data :Also find median using graph .

| Marks | Number of students |
|---|---|
| Less than 20 | 0 |
| Less than 30 | 4 |
| Less than 40 | 16 |
| Less than 50 | 30 |
| Less than 60 | 46 |
| Less than 70 | 66 |
| Less than 80 | 82 |
| Less than 90 | 92 |
| Less than 100 | 100 |

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"Success is a journey, not a destination"



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