Agyat gupta (TARGET MATHEMATICS)
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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.

CLASS X _ 2011-2012 (SA-1)

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

SECTION A

Q.1 If mode of the following data is 7, then value of k in 2, 4, 6, 7, 5, 6, 10, 6, 7, 2k +1,9,7,13 is :
(A) 3 (B) 7 (C) 4 (D) 2

Q.2 If α, β are zeroes of $x^2 - 6x + k$. What is the value of k if $3\alpha + 2\beta = 20$.
(A) -16 (b) 8 (c) -2 (d) -8

Q.3 How many prime factors are there in prime factorization of 5005.
(A) 2 (B) 4 (C) 6 (D) 7

Q.4 Which of the following is defined ?
(a) $\tan 90^0$ (b) $\cot 0^0$ (c) $\operatorname{cosec} 90^0$ (d) $\sec 90^0$

Q.5 Given that HCF (253, 440)=11 and LCM (253, 440)= $253 \times R$. The value of R is
(a) 400 (b) 40 (c) 440 (d) 253

Q.6 If $3\cos\theta = 1$, then the value of $\operatorname{cosec}\theta$ is :
(a) $2\sqrt{2}$ (b) $\frac{3}{2\sqrt{2}}$ (c) $\frac{2\sqrt{3}}{3}$ (d) $\frac{4}{3\sqrt{2}}$

Q.7 If $x = 2^3 \times 3 \times 5^2, y = 2^2 \times 3^3$, then HCF (x,y) is
12 (b) 108 (c) 6 (d) 36

Q.8 The upper limit of the median class of the following distribution is :

Class	0 - 5	6 - 11	12 - 17	18 - 23	24 - 29
Frequency	13	10	15	8	11

(A) 17 (B) 17.5 (C) 18 (D) 18.5

Q.9 If $x = 2\sin^2\theta, y = 2\cos^2\theta + 1$ then the value of $x + y$ is
(A) 2 (B) 3 (C) $\frac{1}{2}$ (d) 1

Q.10 The number of solutions of the pair of linear equations $x + 2y - 8 = 0$ and $2x + 4y = 16$ have :
(a) 0 (b) 1 (c) Infinitely many (d) None

SECTION B

Q.11 What must be added to the polynomial $p(x) = 5x^4 + 6x^3 - 13x^2 - 44x + 7$ so that the resulting polynomial is exactly divisible by the polynomial $Q(x) = x^2 + 4x + 3$ and the degree of the polynomial to be added must be less than degree of the polynomial $Q(x)$

Q.12 Determine *a* and *b* for which the following system of linear equations has infinite number of solutions $2x - (a-4)y = 2b + 1; 4x - (a-1)y = 5b - 1$.

Q.13 If $\sqrt{3}\tan\theta = 3\sin\theta$, then prove that $\sin^2\theta - \cos^2\theta = \frac{1}{3}$.

OR

If $7\sin^2\theta + 3\cos^2\theta = 4$, **then prove that** $\sec\theta + \operatorname{cosec}\theta = 2 + \frac{2}{\sqrt{3}}$

Q.14 If one solution of the equation $3x^2 = 8x + 2k + 1$ is seven times the other. Find the solutions and the value of k.

Q.15 A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household.

Family size :	1 - 3	3 - 5	5 - 7	7 - 9	9 - 11
Number of families :	7	8	2	2	1

Find the mode for the data above .

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Q.16 In figure 4, sides XY and YZ and median XA of a triangle XYZ are respectively proportional to sides DE, EF and median DB of ΔDEF. Show that $\Delta XYZ \sim \Delta DEF$.

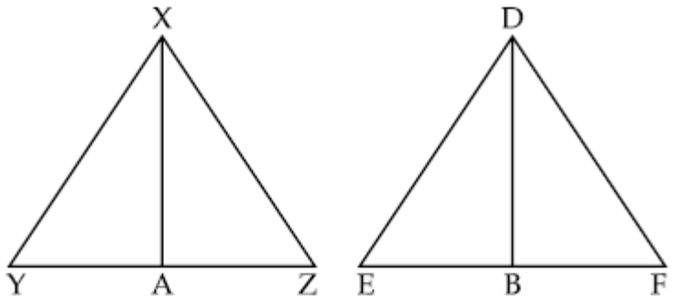

Figure 4

Q.17 If α, β, γ are zeroes of the polynomial $6x^3 + 3x^2 - 5x + 1$, then find the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$.

Q.18 In fig 3, O is a point inside $\Delta POR = 90^0, OP = 6cm$ and OR = 8cm. If PQ = 24cm , QR = 26cm .Prove that ΔQPR is a right angled triangle.

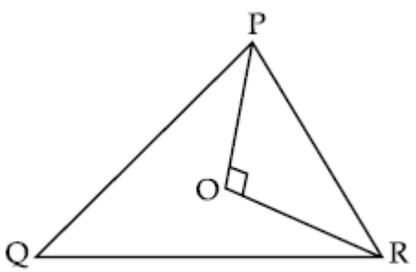

Figure - 3

SECTION C

Q.19 Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then other two sides are divided in the same ratio.

OR

Prove that in a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

Q.20 Draw the graphs of equation $4x - y - 8 = 0$ and $2x - 3y + 6 = 0$. Shade the region between two lines and x-axis. Also find the co-ordinates of the vertices of the triangle formed by there lines and the x-axis.

Q.21 If $a\sin\theta + b\cos\theta = c$, then prove that $a\cos\theta - b\sin\theta = \sqrt{a^2 - b^2 - c^2}$.

OR

If x = r sin A cos CA, y = r sin A sin C and z = r.cosA, prove that $r^2 = x^2 + y^2 + z^2$.

Q.22 Find all the zeros of the polynomial $2x^4 + 7x^3 - 19x^2 - 14x + 30$ if two of its zeros are $\sqrt{2}, -\sqrt{2}$.

Q.23 In figure 2, $\angle ACB = 90^0$ and $CD \perp AB$ .Prove that

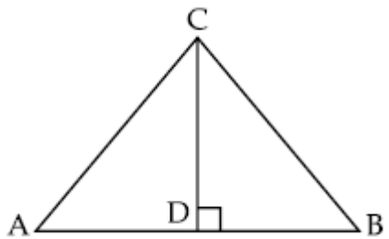

Figure 2

$\frac{BC^2}{AC^2} = \frac{BD}{AD}$.

Q.24 Find a quadratic polynomial whose zeroes are $3 + \sqrt{5}$ and $3 - \sqrt{5}$.

Q.25 Show that the square of any positive integer cannot be of the form $5q + 2$ or $5q + 3$ for any integers q.

Q.26 Find the mean of the following frequency distribution using step-deviation method.

Classes	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35
Frequency	4	5	12	2	2

Q.27 Show that 9^n can't end with 2 for any integer n.

OR

Prove that product of any three consecutive natural number is divisible by 6 .

Q.28 If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, show that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$.

SECTION D

Q.29 During medical chck up of 35 students of a class, their weights were recorded.

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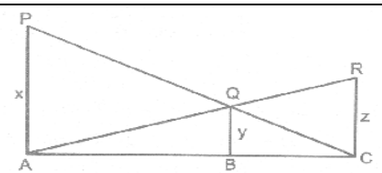
Weight	No. of students
less than 38	0
less than 40	3
less than 42	5
less than 44	9
less than 46	14
less than 48	28
less than 50	32
less than 52	35

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

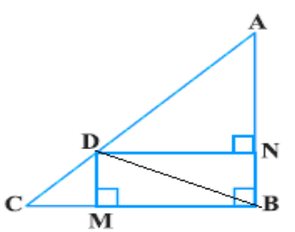
Q.30 Solve for x and y : $(a-b)x+(a+b)y=a^2-2ab-b;^2\ (a+b)(x+y)=a^2+b^2$.

Q.31

In the given figure 

, PA, QB and RC are each perpendicular to AC. Prove that $\frac{1}{x}+\frac{1}{z}=\frac{1}{y}$.

OR

In given Fig. 

, D is a point on hypotenuse AC of Δ ABC, such that $BD \perp AC$ & $DM \perp BC$ and $DN \perp AB$. Prove that :

(i) $DM^2 = DN \times MC$ (ii) $DN^2 = DM \times AN$

Q.32 Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test ?

OR

The sum of the digits of a two digit number is 13. The number obtained by interchanging the digits of the given number exceeds that number by 27. Find the number.

Q.33 Find the value of a and b such that $3x^4+5x^3-7x^2+ax+b$ is divisible by x^2+3x+1 give the remainder 3x + 5 .

Q.34 Prove that $(\sin\theta+\cos ec\,\theta)^2+(\cos\theta+\sec\theta)^2=7+\tan^2\theta+\cot^2\theta$.

_____x_____

There is no substitute for hard work

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