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SUMMATIVE ASSESSMENT - I (2015-2016)

Class-IX
Subject-Maths

Time Allowed : 3 Hrs.

M.M. : 90

Please check the total marks

Do not write any answer on the question paper.

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

SECTION-A

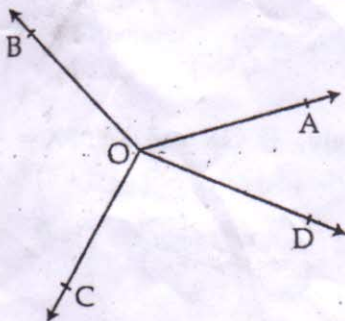
Question numbers 1 to 4 carry one mark each.

1. Simplify $\sqrt{10} \times \sqrt{15}$. 1
2. Find the zero of the polynomial $p(x) = x - 4$. 1
3. Explain when a system of axioms is called consistent. 1
4. The coordinate axes divide the cartesian plane in how many parts. What are these parts known as? 1

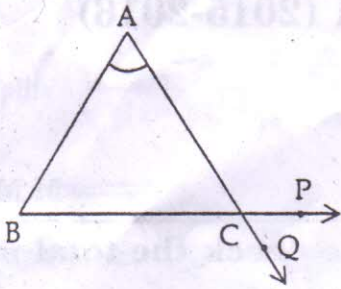
SECTION-B

Question numbers 5 to 10 carry two marks each.

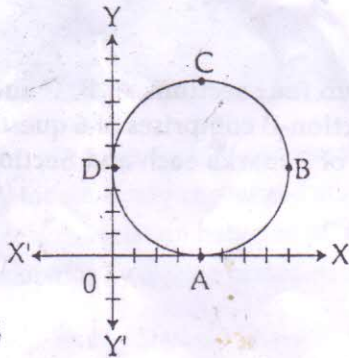
5. Verify that $\sqrt{2} + 15$ and $\pi - 2$ are not rationals. 2
6. By actual division, find the quotient when $p(x) = x^4 - 1$ is divided by $x - 1$. 2
7. In the figure, prove that $\angle AOB + \angle BOC + \angle COD + \angle DOA = 360^\circ$. 2



- 8 In the figure, AC and BC of $\triangle ABC$ are extended to Q and P respectively. If $\angle A = 50^\circ$ and $\angle B = 55^\circ$, find $\angle PCQ$ and $\angle PCA$.



- 9 From the figure, give coordinates of points A, B, C and D:



- 10 The longest side of a right angled triangle is 125 m and one of the remaining two sides is 100 m. Find its area using Heron's formula.

SECTION-C

Question numbers 11 to 20 carry three marks each.

- 11 If $a = 1 + \sqrt{7}$, find the value of $\frac{-6}{a}$ 3

Simplify: $(2)^{\frac{1}{3}} \times \frac{1}{2}$ 3

$\frac{1}{a} = \frac{1}{1 + \sqrt{7}} \times \frac{1 - \sqrt{7}}{1 - \sqrt{7}} = \frac{1 - \sqrt{7}}{-6} = \frac{-1 + \sqrt{7}}{6}$

$[5(8^{\frac{1}{3}} + 27^{\frac{1}{3}})^3]^{\frac{1}{4}}$ 3

$(2+3)^3 = 125$

$5(125)^{\frac{1}{4}} \times 6 \left(\frac{\sqrt{7}-1}{6}\right)$

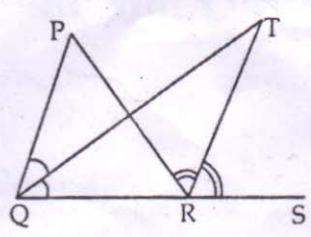
- 13 Find the product $(5a - 3b)(25a^2 + 15ab + 9b^2)$. 3

- 14 Factorise: $12(x^2 + 7)^2 - 8(x^2 + 7)(2x - 1) - 15(2x - 1)^2$ 3

- 15 In a $\triangle XYZ$, O and P are the points on XY and XZ respectively. If $OX = \frac{1}{2} XY$, $PX = \frac{1}{2} XZ$ and $OX = PX$, show that $XY = XZ$. 3

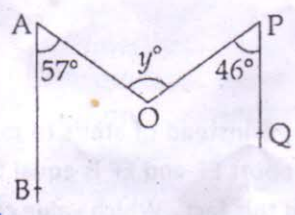
$\Rightarrow (625)^{\frac{1}{4}}$

16 In the figure, the side QR of ΔPQR is produced to a point S. If the bisectors of $\angle PQR$ and $\angle PRS$ meet at a point T, then prove that $\angle QTR = \frac{1}{2} \angle QPR$.



17 Prove that vertically opposite angles are equal.

18 In the figure, if AB and PQ are parallel, find the value of y.



19 Plot a point $P(-3, -4)$ on the cartesian plane. Now, change the sign of its abscissa and call it Q. Plot Q. Also, plot reflections of P and Q in x-axis.

20 Find the area of a quadrilateral ABCD whose sides are 9 m, 40 m, 28 m and 15 m respectively and the angle between the first two sides is a right angle.

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 Give an example of two irrational numbers whose :

- (i) difference is an irrational number
- (ii) sum is an irrational number
- (iii) product is an irrational number
- (iv) division is an irrational number

Justify also.

22 Rationalise the denominator of $\frac{1}{\sqrt{2} + \sqrt{3} + \sqrt{5}}$.

23 Using factor theorem, show that $(a+b)$, $(b+c)$ and $(c+a)$ are factors of $(a+b+c)^3 - (a^3 + b^3 + c^3)$.

24 Find the values of a and b so that $(x+1)$ and $(x-1)$ are the factors of $x^4 + ax^3 - 3x^2 + 2x + b$.

Handwritten calculations for question 20:

$$\begin{array}{r} 2 \overline{) 1681} \\ \underline{8} \\ 88 \\ \underline{16} \\ 200 \\ \underline{160} \\ 400 \\ \underline{320} \\ 800 \\ \underline{800} \\ 0 \end{array}$$

$$\begin{array}{r} 125 \\ \times 41 \\ \hline 125 \\ 500 \\ \hline 5125 \end{array}$$

$$\begin{array}{r} 288 \\ \times 24 \\ \hline 1152 \\ 5760 \\ \hline 6912 \end{array}$$

$$\begin{array}{r} 288 \\ \times 28 \\ \hline 2304 \\ 2304 \\ \hline 8064 \end{array}$$

$$\begin{array}{r} 288 \\ \times 25 \\ \hline 1440 \\ 5760 \\ \hline 7200 \end{array}$$

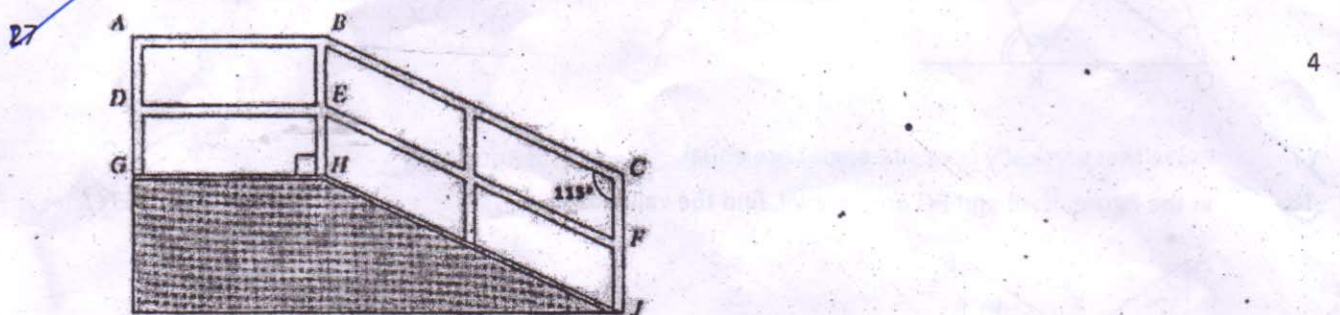
$$\begin{array}{r} 56 \\ \times 18 \\ \hline 448 \\ 1120 \\ \hline 1008 \end{array}$$

25 $(x+y)^3 + (y+z)^3 + (z+x)^3 - 3(x+y)(y+z)(z+x) = 2(x^3 + y^3 + z^3 - 3xyz)$ 4

Prove that :

$(x+y)^3 + (y+z)^3 + (z+x)^3 - 3(x+y)(y+z)(z+x) = 2(x^3 + y^3 + z^3 - 3xyz)$

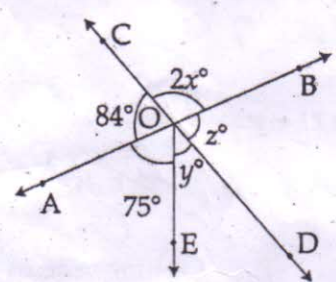
26 Simplify: $\frac{(x^2 - y^2)^3 + (y^2 - z^2)^3 + (z^2 - x^2)^3}{(x - y)^3 + (y - z)^3 + (z - x)^3}$ 4



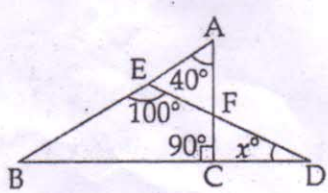
In the given figure ADG represents a College gate followed by a ramp HJ instead of stairs to make it easy for physically challenged students to climb. HJ is equal to mid support EF and EF is equal to BC. What is the relation between BC and HJ? State the Euclid Axiom behind this fact. Which value college is exhibiting by placing ramps instead of stairs? Mention one more Euclid Axiom.

28 Sunil and Shyam have the same weight. If they each gain weight by 5 kg, how will their new weights be compared using the axioms? Write the Euclid's axiom that best supports your answer. Also give two more axioms other than the axiom used in the above situation. 4

29 In the given figure, lines AB and CD intersect each other at O. Find the values of x, y and z. 4



30 In the given figure, find x. 4



31 The angles of a triangle are $(x - 40)^\circ$, $(x - 20)^\circ$ and $(\frac{x}{2} - 10)^\circ$. Find the value of x and then the angles of the triangle. 4