

SUMMATIVE ASSESSMENT - I, 2016-17
MATHEMATICS / Class - IX

Time Allowed : 3 hours

Maximum Marks: 90

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. Find the value of $\frac{3\sqrt{12}}{6\sqrt{27}}$ 1
2. Factorise: $x^2 - 16$. 1
3. If lines l and m are parallel and lines m and n are also parallel, then what can you say about the lines l and n ? 1
4. The area of a parallelogram of altitude 12 cm is 108 cm^2 . Find the base of the parallelogram. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

5. Is π a rational number? Justify your answer. 2
6. Determine whether $3x - 2$ is a factor of $3x^3 + x^2 - 20x + 12$. 2
7. Does Euclid's fifth postulate imply the existence of parallel lines? Explain. 2
8. In the given figure, AB is parallel to CD . Find the value of x . 2



9. Plot the points $(3, -5)$ and $(-3, 5)$ and join them. 2
10. Find the area of a triangle whose sides are 3 cm, 4 cm and 5 cm. Hence, find the corresponding altitude using longest side as base. 2

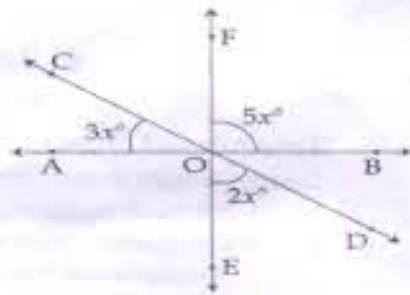
SECTION-C

Question numbers 11 to 20 carry three marks each.

11. Simplify: $3\sqrt{48} - \frac{5}{2}\sqrt{\frac{1}{3}} + 4\sqrt{3}$. 3
12. Simplify: $\frac{2}{\sqrt{5} + \sqrt{3}} + \frac{1}{\sqrt{3} + \sqrt{2}} - \frac{3}{\sqrt{5} + \sqrt{2}}$. 3
13. Expand: $\left(\frac{x}{3} - \frac{y}{2} + 1\right)^2$. 3
14. If $f(x) = 5x^2 - 4x + 5$, find $f(1) + f(-1) + f(0)$. 3

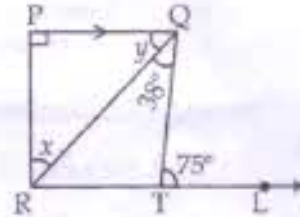
- 15 In the given figure, lines AB, CD and EF meet at O. Find the value of x , hence find all the three indicated angles.

(3)



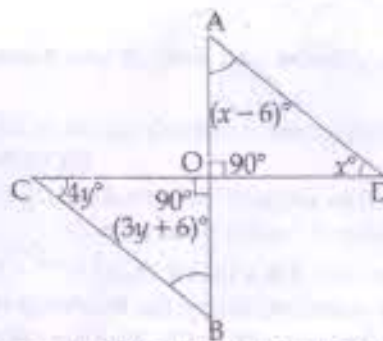
- 16 In the figure, $PQ \perp PR$, $PQ \parallel RL$, $\angle RQT = 38^\circ$ and $\angle QTL = 75^\circ$. Find x and y .

(3)



- 17 Find x and y in the given figure.

(3)



- 18 ABC is a triangle and D is the mid-point of BC. The perpendiculars from D to AB and AC are equal. Prove that triangle is isosceles.
- 19 Plot the points (x, y) given in the following table on the cartesian plane, choosing suitable units of distances on the axes :

x	3.5	1.5	4	-2	-6	5
y	0	-3.5	5	-7	7	-1

(3)

- 20 A triangular park in a city has dimensions 30 m, 26 m and 28 m. A gardener has to plant grass inside it at ₹ 1.50 per m^2 . Find the amount to be paid to the gardener.

SECTION-D

Question numbers 21 to 31 carry four marks each.

- 21 If $x = 9 + 4\sqrt{5}$, find $x^2 + \frac{1}{x^2}$

(4)

- 22 If x is a positive real number and exponents are rational numbers, then simplify :

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \left(\frac{x^c}{x^a}\right)^{c+a-b} \times \left(\frac{x^a}{x^b}\right)^{a+b-c}$$

(3)

- 23 If the polynomial $4x^3 - 16x^2 + ax + 7$, is exactly divisible by $x - 1$, then find the value of a . Hence factorise the polynomial.

(3)

- 24 Divide polynomial $p(x) = x^4 - 4x^3 + 4x^2 + 3x + 4$ by $q(x) = x - 1$ and find what should be added in $p(x)$ so that it is divisible by $q(x)$.

(4)

- 25 Factorise : $a^3 - 27b^3 + 9a^2b - 27ab^2$

(2)

- 26 Prove that $(x+y)^3 + (y+z)^3 + (z+x)^3 - 3(x+y)(y+z)(z+x) = 2(x^3 + y^3 + z^3 - 3xyz)$.

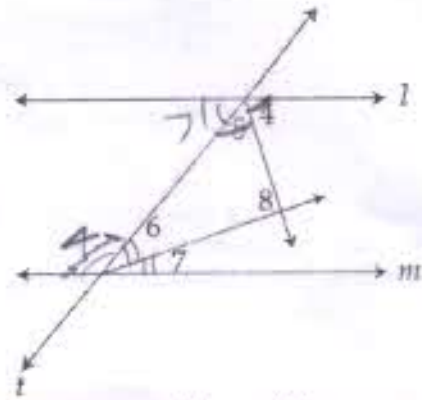
(4)

27

Students in a school are preparing Banner for a rally to make people aware for saving electricity. What value are they exhibiting by doing so?

Parallel lines l and m are cut by transversal t , if $\angle 4 = \angle 5$, and $\angle 6 = \angle 7$, what is measure of angle 8?

3

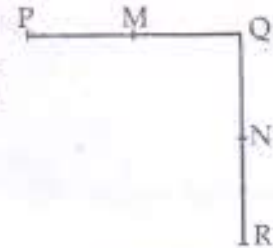


4

28

In the given figure, $PQ = QR$, M is the mid-point of PQ and N is the mid-point of QR . Show that $PM = NR$. State which axiom you use here. Also give two more axioms other than the axiom used in the above situation.

3

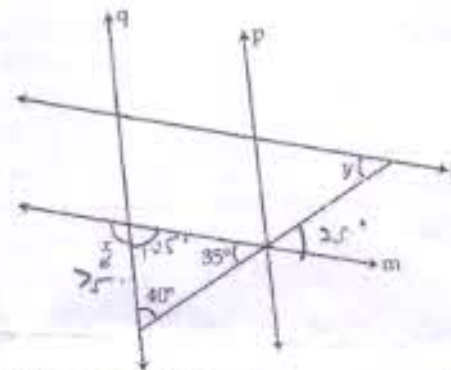


4

29

In the figure, find x and y , if $l \parallel m$ and $p \parallel q$.

4



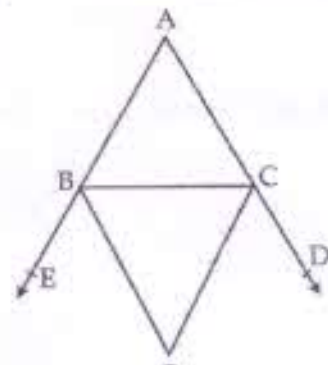
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30

In the figure, the sides AB and AC of $\triangle ABC$ are produced to points E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at a point O , then prove that

$$\angle BOC = 90^\circ - \frac{1}{2} \angle BAC.$$

4

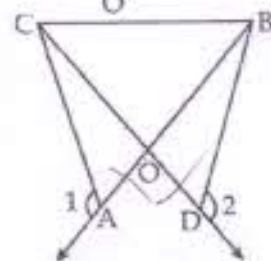


4

31

In the figure, $OA = OD$ and $\angle 1 = \angle 2$. Prove that $\triangle OCB$ is an isosceles triangle.

2



4

-ofoOno-