



Gurukul Global School
Session 2022-23
Term - I
Class - IX
Mathematics (041)

Date: 05-09-2022

Time: 3 hrs.

M.M. 80

General Instructions:

- i. This question paper contains two parts A and B.

Part - A:

- i. It consists three sections- I and II.
ii. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
iii. Section II has 4 questions on case study.

Part - B:

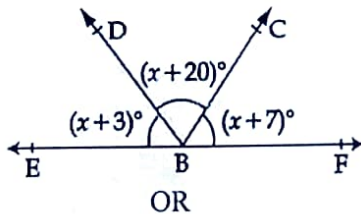
- i. Question No 21 to 26 are very short answer type questions of 2 marks each.
ii. Question No 27 to 33 are short answer type questions of 3 marks each.
iii. Question No 34 to 36 are long answer type questions of 5 marks each.
iv. Internal choice is provided in 2 questions of two marks, 2 questions of 3 marks and 1 question of 5 marks.

Part-A
Section - I

Section I has 16 questions of 1 mark each.

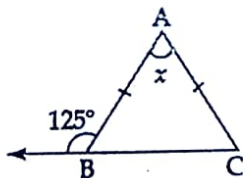
Q.1

In the given figure, find the value of x .



OR

In the figure below if $AB = AC$, the value of x is :



Q.2

Write Euclid's fifth postulate.

Q.3

If the base of a right triangle is 15 cm and its hypotenuse is 25 cm. Then its area is:

OR

If the area of an equilateral triangle is $16\sqrt{3} \text{ m}^2$. Its perimeter (in meters) is:

1

1

1

Q.4

If $(x-1)$ is a factor of the polynomial $p(x) = 3x^4 - 4x^3 - ax + 2$ then find the value of 'a'?

OR

What is the remainder when $x^3 - 2x^2 + x + 1$ is divided by $(x-1)$?

Q.5

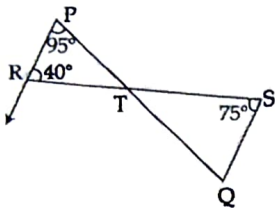
Simplify $\left(\frac{64}{125}\right)^{-2/3}$

Q.6

The area of a triangle whose sides are 13 cm, 14 cm and 15 cm is :

Q.7

In the given figure, line segments PQ and RS intersect each other at a point T such that $\angle PRT = 40^\circ$, $\angle RPT = 95^\circ$ and $\angle TSQ = 75^\circ$. Find $\angle SQT$.



Q.8

Expand $\left(\frac{1}{4}a - \frac{1}{2}b + 1\right)^2$

Q.9

$\frac{p}{q}$ form of the number $0.\bar{3}$ is :

Q.10

Which of the following points lies on x-axis? Which on y-axis?

A(0, 2), B(5, 6), C(-3, 0), D(0, -3), E(0, 4), F(6, 0), G(3, 0)

Q.11

$\sqrt{2}$ is a polynomial of degree :

Q.12

Find two irrational numbers between $3/5$ and $4/5$.

OR

Write two irrational numbers.

Q.13

Degree of zero polynomial is:

OR

Degree of a constant polynomial is:

Q.14

Evaluate $(102)^3$, using suitable identity.

Q.15

Using suitable identity evaluate $(-32)^3 + (18)^3 + (14)^3$.

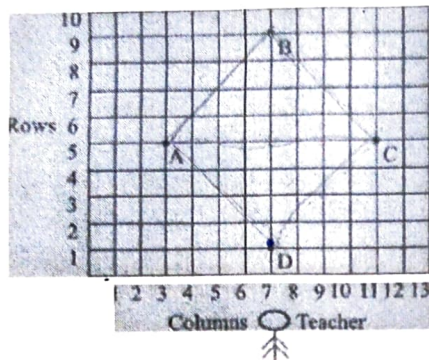
Two angles measure $(30 - a)^\circ$ and $(125 + 2a)^\circ$. If each one is the supplement of the other, then the value of a is :

1

Section-II

Case Study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark.

Q17. One day our Principal Maam was on round and wanted to test the knowledge of the class of Coordinate Geometry and so she asked various questions from the students:



1. Coordinates of A and B are

- a) (5,3) and (9,7)
b) (3,5) and (7,9)

- c) (7,1) and (3,5)
d) (3,5) and (7,1)

1

2. Area of ΔABC is

- a) 16 sq. units
c) 32 sq. units

- b) 8 sq. units
d) 12 sq. units

1

3. Abscissa of point D

- a) 1
c) 3

- b) 7
d) 11

1

4. Quadrilateral formed by joining ABCD is

- a) Rectangle
c) Trapezium

- b) Rhombus
d) Kite

1

5. Area of ABCD is

- a) 12 sq. units
c) 32 sq. units

- b) 16 sq. units
d) 10 sq. units

1

Q 18 Chapter Polynomial is considered as one of the important chapters in the field of mathematics, various identities are there to enhance the knowledge of students:

1. $(x + 3)(x - 4)$ is equal to:

- (a) $x^2 - x - 12$
(b) $x^2 + x + 12$

- (c) $x^2 - x + 12$
(d) $x^2 + x - 12$

1

2. $(999)^3$ is equal to:

- (a) 997,000,999
(b) 997,002,999

- (c) 999,700,200
(d) 997,000,999

1

3. $(3a - 7b - c)^2$ is equal to:

- (a) $9a^2 - 49b^2 - c^2 - 42ab - 14bc - 6ac$
(b) $9a^2 + 49b^2 + c^2 - 42ab + 14bc - 6ac$

- (c) $9a^2 + 49b^2 + c^2 + 42ab - 14bc - 6ac$
(d) $9a^2 - 49b^2 - c^2 - 42ab - 14bc + 6ac$

1

4. $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

- (a) $(-2x + 3y + 4z)^2$
 (b) $(-2x + 3y - 4z)^2$

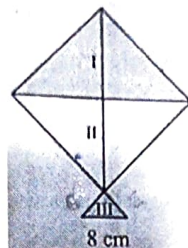
- (c) $(-2x - 3y + 4z)^2$
 (d) $(-2x + 3y - 4z)^2$

5. $27y^3 + 125z^3$ is equal to:

- (a) $(3y + 5z)(9y^2 + 25z^2 - 15yz)$
 (b) $(3y - 5z)(9y^2 + 25z^2 - 15yz)$

- (c) $(3y + 5z)(9y^2 + 25z^2 + 15yz)$
 (d) $(3y + 5z)(9y^2 - 25z^2 - 15yz)$

Q19 Basant Panchami is a very exciting festival for kids, they love to fly kites in the sky and enjoy this festival and start preparing well in advance for the festival. They buy various types of kites and fly high in the sky on this day. The kite is a square with a diagonal 32 cm and an isosceles triangle of base 8cm and 6cm.



1. The length of another diagonal is:

- (a) 34 cm
 (b) 32 cm

- (c) 64 cm
 (d) 16 cm

2. Area of I is:

- (a) 258 cm^2
 (b) 256 cm^2

- (c) 128 cm^2
 (d) 356 cm^2

3. Area of II is:

- (a) 260 cm^2
 (b) 256 cm^2

- (c) 128 cm^2
 (d) 356 cm^2

4. Each side of the kite is:

- (a) $16\sqrt{2} \text{ cm}$
 (b) $16\sqrt{3} \text{ cm}$

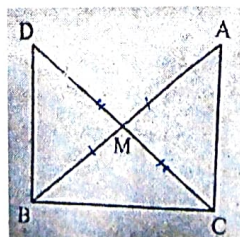
- (c) $18\sqrt{2} \text{ cm}$
 (d) $32\sqrt{3} \text{ cm}$

5. Area of number III is:

- (a) $8\sqrt{5} \text{ cm}^2$
 (b) $5\sqrt{5} \text{ cm}^2$

- (c) $6\sqrt{8} \text{ cm}^2$
 (d) $9\sqrt{5} \text{ cm}^2$

Q20 Basics of triangle must be very strong, I, with my personal and long experience want to share with you that many students are weak in geometry so it's my personal advice that always focus on basics not on questions. NCERT books are excellent for above purpose, some questions are asked to test the knowledge of students:



In a right triangle ABC, right angled at C, M is the midpoint of Hypotenuse AB. C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to point B.

1. Congruency of triangle:

- (a) $\Delta AMC \cong \Delta BMD$
 (b) $\Delta ACM \cong \Delta BMD$

- (c) $\Delta MCA \cong \Delta BMD$
 (d) $\Delta AMC \cong \Delta BDM$

Measurement of an angle:

- (a) $\angle DBC = 45^\circ$
(b) $\angle DBC = 55^\circ$

- (c) $\angle DBC = 90^\circ$
(d) $\angle DBC = 180^\circ$

1

3. Congruency of triangle:

- (a) $\triangle DBC \cong \triangle ACB$
(b) $\triangle DCB \cong \triangle BMD$

- (c) $\triangle BDC \cong \triangle BMD$
(d) $\triangle DBC \cong \triangle ABC$

1

4. Mid-point:

- (a) $CM = 1/2 AB$
(b) $CM = 1/3 AB$

- (c) $CM = 1/4 AB$
(d) $CM = 1/5 AB$

1

5. Parallel lines

- (a) $DB \parallel AC$
(b) $DB \parallel BC$

- (c) $DB \parallel BM$
(d) $DB \parallel MC$

1

Part-B

All questions are compulsory

Question numbers 21 to 26 carry 2 marks each.

Q.21 ✓

Represent $\sqrt{3.2}$ on the number line.

2

Q.22

Prove that if two lines intersect, the vertically opposite angles are equal.

OR

Prove that the sum of three angles of a triangle is 180°

2

Q.23

ABC is an isosceles triangle with $AB = AC$. Draw $AP \perp BC$. Show that $\angle B = \angle C$.

2

Q.24 ✓

Find the height of the trapezium in which parallel sides are 25 cm and 10 cm and non-parallel sides are 14 cm and 13 cm.

OR

Find the value of a if the polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$

when divided by $(x - 4)$, leave the same remainder.

2

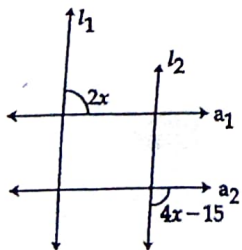
Q.25 ✓

Represent $\sqrt{3}$ on number line.

2

Q.26

In the figure below, $l_1 \parallel l_2$ and $a_1 \parallel a_2$. Find the value of x.



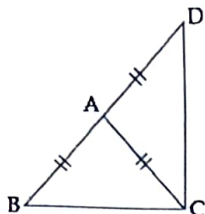
2

Section-C

Question numbers 27 to 33 carry 3 marks each.

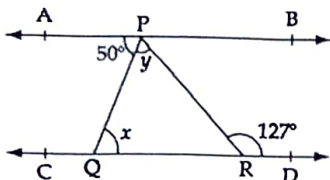
Q.27

In figure, ABC is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$. Show that BCD is a right angle.



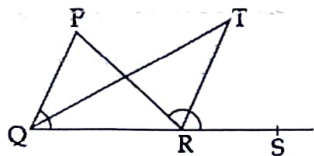
Q.28

In the given figure, if $AB \parallel CD$, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$, find x and y .



Q.29

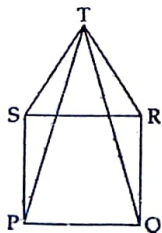
In the given figure, the side QR of $\triangle PQR$ is produced to a point S. If the bisectors of $\angle PQR$ and $\angle PRS$ meet at point T, then prove that $\angle QTR = \frac{1}{2} \angle QPR$.



OR

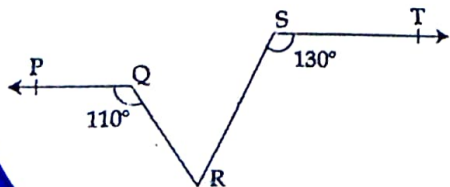
In the given figure, PQRS is a square and SRT is an equilateral triangle. Prove that:

- (i) $\angle PST = \angle QRT$
- (ii) $PT = QT$
- (iii) $\angle QTR = 15^\circ$



Q.30

In the given figure, if $PQ \parallel ST$, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$ find $\angle QRS$.



Q.31

Factorise : $x^2 + \frac{x}{4} - \frac{1}{8}$.

3

3

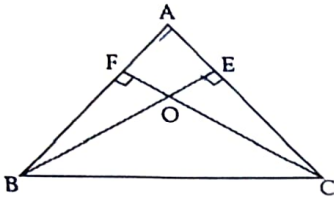
OR

What are the possible expressions for the dimensions of a cuboid whose volume is given below ?

Volume = $12ky^2 + 8ky - 20k$.

Q.32

In given figure below, ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal. Show that

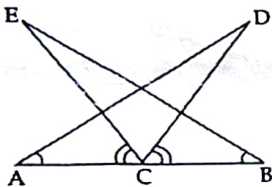


(i) $\triangle ABE \cong \triangle ACF$

3

Q.33

In given figure below, C is the mid point of AB. $\angle ACE = \angle BCD$ and $\angle CAD = \angle CBE$. Show that



(i) $\triangle DAC \cong \triangle EBC$

3

Question numbers 34 to 36 carry 5 marks each.

Q.34

Find the values of a and b if $\frac{7 + 3\sqrt{5}}{3 + \sqrt{5}} - \frac{7 - 3\sqrt{5}}{3 - \sqrt{5}} = a + \sqrt{5}b$

5

Q.35

Factorize : $x^3 - 3x^2 - 9x - 5$.

OR

Prove that $-(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3$

$= 3(a + b)(b + c)(c + a)(a - b)(b - c)(c - a)$

5

Q.36

Simplify : $\frac{1}{2 + \sqrt{5}} + \frac{1}{\sqrt{5} + \sqrt{6}} + \frac{1}{\sqrt{6} + \sqrt{7}} + \frac{1}{\sqrt{7} + \sqrt{8}}$.

5
