...learning beyond classroom

DWARKA INTERNATIONAL SCHOOL
HALF – YEARLY EXAM. SESSION – (2024-25)
CLASS – IX, SUBJECT: MATHEMATICS (041)
SET – A

NAME: Ananya Kangia

Roll No. - 9

Time: 3Hrs.

M.M: 80

General Instruction:

(i) All questions are compulsory.

(ii) The question paper consists of 38 questions divided into 5 – sections A, B, C, D &E.

(iii) Section A consists of 20 questions of 1 mark each. Section B consists of 5questions of 2 marks each, Section C consists 6 questions of 3 marks each, Section D consists of 4 question of 5 marks each and section E consists of 3 case – study-based questions of 4 marks each.

SECTION – A

(1 X 20 = 20)

Q.1) Simplified value of $\sqrt[4]{81^{-2}}$ is

(a) $\frac{1}{9}$ (b) $\frac{1}{3}$ (c) 1   (d) $\frac{1}{81}$

Q.2) The value of $\sqrt{10} \times \sqrt{15}$ is

(a) $6\sqrt{5}$ (b) 10   (c) $5\sqrt{6}$ (d) $4\sqrt{5}$

Q.3) The value of 0.47777……. is

(a) $\frac{43}{90}$ (b) $\frac{45}{90}$ (c) $\frac{43}{900}$ (d) none

Q.4) If $a + b + c = 0$ then $a^3 + b^3 + c^3 =$

(a) 1   (b) 2abc   (c) 3abc   (d) none

Q.5) $\sqrt{2}$ is a polynomial of degree

(a) 2   (b) 0   (c) 1   (d) $\frac{1}{2}$

Q.6) If $p(x) = x^2 - 2\sqrt{2}x + 1$ then $p(2\sqrt{2})$ is

(a) 0   (b) 1   (c) $4\sqrt{2}$ (d) $8\sqrt{2} + 1$

Q.7) Point (0 , 5.5) lies:

(a) On X- axis   (b) In II quadrant

(c) On Y-axis   (d) In IV quadrant

Q.8) The distance of the point P (– 4 , –5) from Y – axis is

(a) 4 units   (b) 5 units   (c) –5 units   (d) none .

Q.9) The point where two co – ordinate axes meet is

(a) abscissa   (b) ordinate   (c) origin   (d) quadrant

Q10.) If $x = 3$ and $y = -4$ is a solution of the equation: $5x - 3y = k$ then the value of k is

(a) 30   (b) 27   (c) 24   (d) none

Q.11) A linear equation $2x - 5y = 7$ has

(a) a unique solution   (b) two solutions

(c) infinitely many solutions   (d) no solution

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Q.12) A linear equation in two variables x and y is of the form $ax + by + c = 0$ where

    (a) $a \neq 0$, $b \neq 0$ (b) $a \neq 0$, $b = 0$ (c) $a = 0$, $b \neq 0$ (d) $a = 0, c = 0$

Q.13) Which of the following is not a criterion for congruence of triangles?

    (a) SAS   (b) ASA   (c) SSA   (d) SSS

Q.14) An angle which measures more than 180^0 but less than 360^0 is called

    (a) an acute $\angle$ (b) an obtuse $\angle$ (c) a straight $\angle$ (d) a reflex $\angle$

Q.15) An angle is one fifth of its complement angle. The measure of the angle is

    (a) 15^0 (b) 30^0 (c) 75^0 (d) 150^0

Q16) If $\triangle ABC \cong \triangle DEF$ then which of the following is true?

    (a) AB = DE   (b) CA = EF   (c) AC = DE   (d) none.

Q.17) If AB = QR , BC = PR, and $\angle B = \angle R$ then by which condition $\triangle ABC$ is congruent

    to $\triangle PQR$

    (a) S. A. S   (b) S.S.S   (c) R.H.S   (d) none

Q.18) The height of the rectangle in a histogram is

    (a) width of the class   (b) upper limit of the class

    (c) lower limit of the class   (d) frequency of the class

Assertion – Reason Based Questions: (19 – 20) .

    The following questions consists of two statements – Assertion (A) and Reason(R).

    Answer these questions selecting the appropriate option given below.

    (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

    (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

    (c) Assertion (A) is true but Reason (R) is false.

    (d) Assertion (A) is false but Reason (R) is true.

Q.19) Assertion (A): The value of $(111)^3 = 1367631$.

    Reason (R): $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$.

Q.20) Assertion (A): If in a $\triangle ABC$, $AB = BC = AC$ then measure of each angle is 30^0 .

    Reason (R): The angles opposite to equal sides of a triangle are equal.

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SECTION – B   (2 X 5 =10)

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Q.21) Simplify: $\sqrt[4]{16} - 6\sqrt[3]{343} + 18\sqrt[5]{243} - \sqrt{196}$

Q.22) If $f(x) = 5x^2 - 4x + 5$, Evaluate: $f(2) - f(-1) + f\left(\frac{1}{3}\right)$.

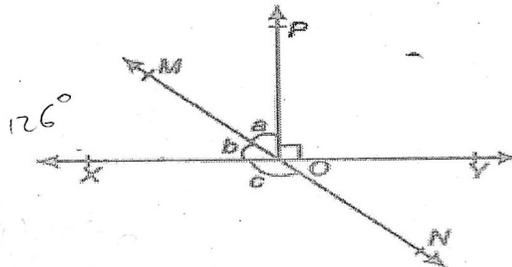<div align="center">

OR

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    Factorise: (i) $2x^2 + 7x + 3$ (ii) $3x^2 - x - 4$.

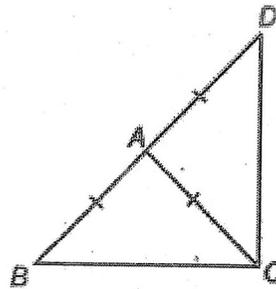Q.23) If the point $(2k - 3, k + 2)$ lies on the graph of the equation : $2x + 3y + 15 = 0$, find k.

Q.24) In the given figure, lines XY and MN

    intersect at O. If $\angle POY = 90^0$ and

    a : b = 2 : 3, find the value of c.

Q.25) In the given figure, ΔABC is an isosceles triangle in which AB = AC. Side BA is produced to point D such that AD = AB. Show that $\angle BCD = 90^0$.

OR

Prove that, "Angles opposite to equal sides of an isosceles triangle are equal".

SECTION – C   (3x 6 = 18)

Q.26) Find the value of "a" and "b" if: $\dfrac{\sqrt{2}+1}{\sqrt{2}-1} - \dfrac{\sqrt{2}-1}{\sqrt{2}+1} = a + b\sqrt{2}$.

OR

If $x = \dfrac{1}{3+2\sqrt{2}}$ and $y = \dfrac{1}{3-2\sqrt{2}}$, find the value of $x^2 + y^2 + xy$.

Q.27) Factorise: (i) $25x^2 - 35x + 12$ (ii) $8x^3 - 125$.

Q.28) In which quadrant or on which axis do each of the points: $A(-2,4), B(3,-1), C(-1,0), D(1,2), E(0,-5)$ and $F(-3,-5)$ lie? Verify the answer by locating on the Cartesian plane?

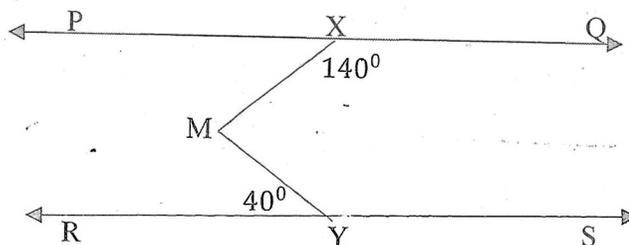Q.29) Write four different solutions of the equation: $2(x-1) + y = 7$.

Q.30) In the given fig. POQ is a line. Ray OR is perpendicular to the line PQ. OS is another ray lying between rays OP and OR.

Prove that: $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$
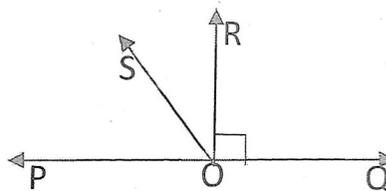
OR

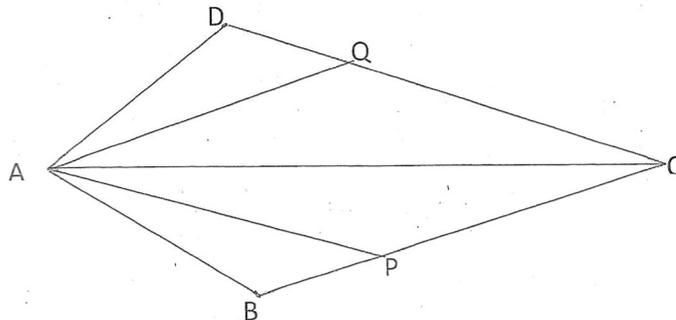In the given figure, $PQ \parallel RS$, $\angle MXQ = 140^0$ and $\angle MYR = 40^0$, then find $\angle XMY$.

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Q.31) In the given figure AB = AD, $\angle BAP = \angle QAD$ and $\angle PAC = \angle CAQ$. Prove that: DC = BC.

<div align="center">SECTION – D</div> (5 x 4 = 20)

Q.32) Simplify: $\dfrac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \dfrac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \dfrac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$.
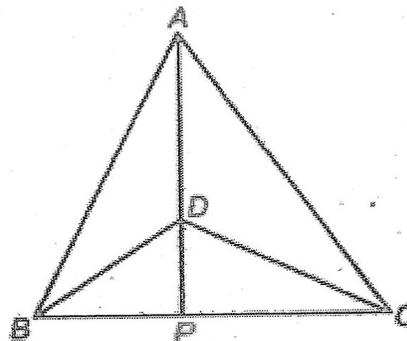
<div align="center">OR</div>

Prove that : $\dfrac{1}{3-\sqrt{8}} - \dfrac{1}{\sqrt{8}-\sqrt{7}} + \dfrac{1}{\sqrt{7}-\sqrt{6}} - \dfrac{1}{\sqrt{6}-\sqrt{5}} + \dfrac{1}{\sqrt{5}-2} = 5$
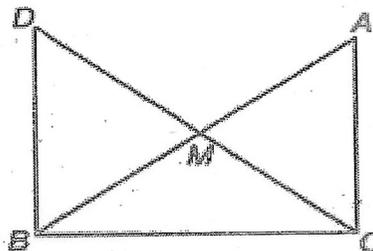
Q.33) Factorise: $x^3 - 23x^2 + 142x - 120$

Q.34) ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P, show that:
(i) $\Delta ABD \cong \Delta ACD$
(ii) $\Delta ABP \cong \Delta ACP$
(iii) AP bisects $\angle A$ as well as $\angle D$.
(iv) AP is the perpendicular bisector of BC.

<div align="center">OR</div>

In a right triangle ABC, right angled at C, M is the mid – point of hypotenuse AB. C is joined to a point M and produced to a point D such that DM = CM. Point D is joined to point B as shown in the figure. Show that : (i) $\Delta AMC \cong \Delta BMD$
(ii) $\angle DBC$ is a right angle.
(iii) $\Delta DBC \cong \Delta ACB$
(iv) $CM = \dfrac{1}{2} AB$.

Q.35) Draw a histogram and frequency polygon of the following data:

Weight (in Kg)	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65	65 – 70
No. of People.	12	22	27	20	9	7

<div align="center">4</div>

SECTION – E (CASE – STUDY)   (3 x 4 = 12)

CASE – STUDY – I

Q.36) There is a square park ABCD in the middle of Saket colony in Delhi. Four children Deepak, Ashok, Arjun and Deepa went to play with their balls. The colour of the ball of Ashok, Deepak, Arjun and Deepa are red, blue, yellow and green respectively. All four children roll their ball from centre point O in the direction of XOY, X'OY, X'OY' and XOY'. Their balls stopped as shown in the above image.
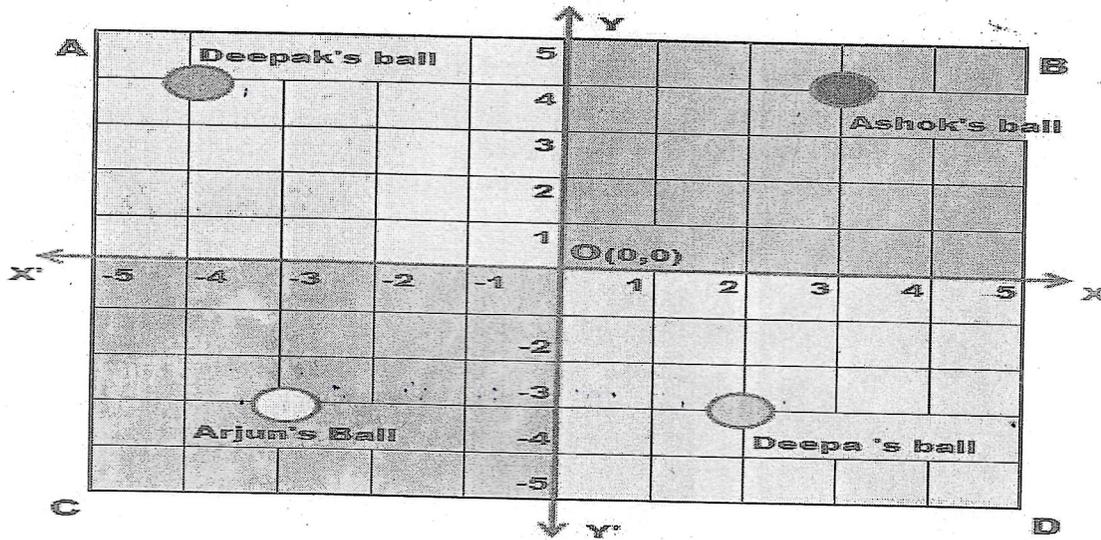
Based on the above information, Answer the following questions:

(i) What are the coordinates of the ball of Ashok?   (1)

(ii) What is the ordinate of the ball of Arjun?   (1)

(iii) Find the distance between Arjun's ball and Ashok's ball?   (2)

OR

Find the area of the figure formed by joining the four points?   (2)

CASE – STUDY – II

Q.37) Beti Bachao, Beti Padhao (BBBP) is a personal campaign of the Government of India that aims to generate awareness and improve the efficiency of welfare services intended for girls. In a school, a group of $(x + y)$ teachers, $(x^2 + y^2)$ girls and $(x^3 + y^3)$ boys organised a campaign on Beti Bachao, Beti Padhao.

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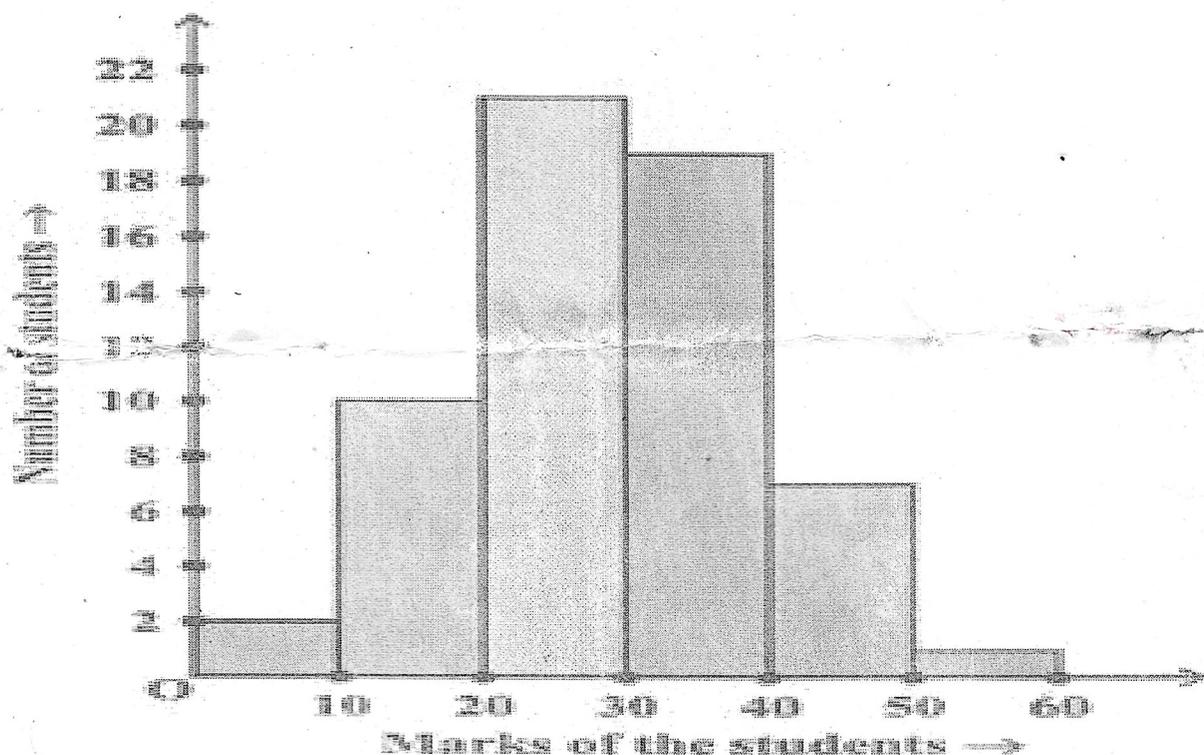Based on the above information, Answer the following questions:

(i)   Which mathematical concept is used in the above information?   (1)
(ii) Write the identity of $(x^3 + y^3)$ in the product form?   (1)
(iii) In a group of 10 teachers and 58 girls, find the number of boys?   (2)

OR

Find $(x^2 - y^2)$, if there are 10 teachers and $x - y = 23$.   (2)

CASE – STUDY – III

Q.38) Anil is a Mathematics teacher in Hyderabad. After Periodic test 3, he asks students to collect the mathematics marks of all the students of Class IX- A, B and C. A student is able to collect marks from some students. Rekha scored least marks 6 in the class and Ram scored highest marks 59 in the class. He prepares the frequency distribution table using the collected marks and draws Histogram using the table as shown in adjoining figure.

Based on the above information, Answer the following questions:

(i)   What is the width of the class?   (1)
(ii) Find the class – mark of the class interval 40 – 50.   (1)
(iii) Find the total number of students appeared in the test?   (2)

OR

What information does this histogram conveys?   (2)

END OF THE PAPER