

SELF-ASSESSMENT TEST

Time allowed: 1 hour

Max. marks: 40

SECTION A

1. Choose and write the correct option in the following questions.

(4 × 1 = 4)

(i) Every rational number is

(a) a natural number

(b) an integer

(c) a whole number

(d) a real number

(ii) $\sqrt{8} \times \sqrt{24}$ is equal to

(a) $2\sqrt{6}$

(b) $5\sqrt{12}$

(c) $9\sqrt{48}$

(d) $8\sqrt{3}$

(iii) If $\sqrt{2} = 1.4142$, then $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}}$ is equal to

(a) 2.4142

(b) 5.8282

(c) 0.4142

(d) 0.1718

(iv) Which of the following is equal to x ?

(a) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$

(b) $12\sqrt{(x^4)^{\frac{1}{3}}}$

(c) $(\sqrt[3]{x^2})^{\frac{3}{2}}$

(d) $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

2. Fill in the blanks.

(3 × 1 = 3)

(i) 0 is a _____ number.

(ii) If x & y are two irrational numbers then an irrational number _____ always lies between them.

(iii) For every real number, there exists a _____ point on the number line.

3. The following questions consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation for A.

(b) Both A and R are true and R is not the correct explanation for A.

(c) A is true but R is false.

(d) A is false but R is true.

(3 × 1 = 3)

Real Numbers

(i) **Assertion (A)** : The simplest form of $0.\overline{54}$ is $\frac{7}{11}$.

Reason (R) : A number whose decimal expansion is terminating or non-repeating recurring (repeating) is rational.

$$\therefore 0.\overline{54} = \frac{6}{11}$$

(ii) **Assertion (A)** : $(5 + \sqrt{2}) + (5 - \sqrt{2})$ is a rational.

Reason (R) : Sum of two irrational numbers may be rational or irrational.

(iii) **Assertion (A)** : A rational number between 4 and 5 is $\frac{9}{2}$.

Reason (R) : A rational number between two rational numbers a and b is $\frac{a+b}{2}$.

SECTION B

■ Solve the following questions.

(3 × 2 = 6)

4. Express $0.1\overline{34}$ in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$. [NCERT Exemplar]

5. If $\sqrt{2} = 1.414$ and $\sqrt{3} = 1.732$, then find the value of $\frac{\sqrt{6}-1}{\sqrt{3}}$ up to three places of decimal.

6. Simplify: $\frac{2+\sqrt{3}}{2-\sqrt{3}} - \frac{2-\sqrt{3}}{2+\sqrt{3}}$

■ Solve the following questions.

(4 × 3 = 12)

7. Simplify: $(256)^{-\left(4^{\frac{3}{2}}\right)}$

[NCERT Exemplar]

8. Show that $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c = 1$.

9. Simplify the following:

(i) $\frac{1}{\sqrt{3} + \sqrt{2} - \sqrt{5}}$

(ii) $\frac{\sqrt{5}-2}{\sqrt{5}+2} - \frac{\sqrt{5}+2}{\sqrt{5}-2}$

10. Simplify:

(i) $\frac{4\sqrt{2}}{\sqrt{15}-3\sqrt{2}} + \frac{3\sqrt{5}}{\sqrt{10}-\sqrt{3}} + \frac{5\sqrt{5}}{\sqrt{6}+\sqrt{5}}$

(ii) $128^{\frac{2}{7}} - (625^{-3})^{\frac{1}{4}} + 14(2401)^{\frac{1}{4}}$

■ Solve the following questions.

(3 × 4 = 12)

11. Evaluate: $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \dots + \frac{1}{\sqrt{9}+\sqrt{8}}$

12. Find the value of $\frac{1}{\sqrt{3}-\sqrt{2}-1}$ correct to three places of decimal if $\sqrt{2} = 1.414$ and $\sqrt{6} = 2.45$.

13. If $a = 8 + 3\sqrt{7}$ and $b = \frac{1}{a}$ then what will be the value of $a^2 + b^2$?

Answers

1. (i) (d) (ii) (d) (iii) (c) (iv) (c)

2. (i) real (ii) \sqrt{xy} (iii) unique

3. (i) (d) (ii) (a) (iii) (a) 4. $\frac{133}{290}$

5. 0.837

6. $8\sqrt{3}$

7. $\frac{1}{2}$ 9. (i) $\frac{3\sqrt{2} + 2\sqrt{3} + \sqrt{30}}{12}$ (ii) $-8\sqrt{5}$

10. (i) $\frac{168-28\sqrt{30}-96\sqrt{15}+360\sqrt{2}}{21}$ (ii) $\frac{-491}{4}$

11. 2

12. -1.466

13. 254

SELF-ASSESSMENT TEST

Time allowed: 1 hour

Max. marks: 40

SECTION A

1. Choose and write the correct option for each of the following questions. $(4 \times 1 = 4)$

- (i) If $p(x) = 3x^2 + 6x - 24$ then $p(-2)$ is
(a) -48 (b) 24 (c) -24 (d) -12
- (ii) The value of $300^2 - 299^2$ is
(a) 1^2 (b) 499 (c) 600 (d) 599
- (iii) One of the factors of $(25x^2 - 1) + (1 + 5x)^2$ is [NCERT Exemplar]
(a) $5 + x$ (b) $5 - x$ (c) $5x - 1$ (d) $10x$
- (iv) If $x - 2$ is a factor of the polynomial $2x^2 + kx - 15$, then the value of k is
(a) 7 (b) -7 (c) $-\frac{7}{2}$ (d) $\frac{7}{2}$

2. Fill in the blanks. $(3 \times 1 = 3)$

- (i) If $(x - 2)$ is a factor of the polynomial $p(x)$, then $p(2)$ _____.
- (ii) If $p(x) = x^3 - 2x + 2$ then $p(-2) =$ _____.
- (iii) If $p(x) = x^2 - 5x + 4$ and $q(x) = x^3 + 1$ then $p(1) \times q(1)$ _____.

3. The following questions consist of two statements—Assertion(A) and Reason(R). Answer these questions selecting the appropriate option given below:

- (a) Both A and R are true and R is the correct explanation for A.
- (b) Both A and R are true and R is not the correct explanation for A.

Polynomial

(c) A is true but R is false.

(d) A is false but R is true.

(i) Assertion (A) : If $p(x) = x^3 + 2x^2 + 3k + 1$ is divided by $(x + 1)$, then remainder is 0.

Reason (R) : If polynomial $p(x)$ is divided by $(x - a)$, then remainder is $p(a)$.

(ii) Assertion (A) : $a^3 - 2\sqrt{2}b^3 = (a - \sqrt{2}b)(a^2 + \sqrt{2}ab + 2b^2)$

Reason (R) : $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

(iii) Assertion (A) : If $\frac{a}{b} + \frac{b}{a} = -1$, then the value of $(a^3 - b^3)$ is 0.

Reason (R) : $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

SECTION B

■ Solve the following questions.

4. Find the value of the polynomial $3x^3 - 4x^2 + 7x - 5$ when $x = 3$.

5. If $p(x) = x^3 - 4x + 3$, evaluate $p(2) - p(-1) + p\left(\frac{1}{2}\right)$.

6. If $p(x) = 10x - 4x^2 - 3$, and $q(x) = (x + 2)(x - 2)$. Then find the value of $p(0) \times q(3)$.

■ Solve the following questions.

7. Find the remainder when $p(x) = x^3 - 2x^2 - 4x - 1$ is divided by $g(x) = x + 1$.

8. For what value of m , is $x^3 - 2mx^2 + 16$ divisible by $x - 2$?

9. Simplify: $(2x - 5y)^3 - (2x + 5y)^3$

10. If $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that $p = r$.

■ Solve the following questions.

11. If a, b, c are all non-zeros and $a + b + c = 0$, prove that $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$.

12. If $a + b + c = 5$ and $ab + bc + ca = 10$, then prove that $a^3 + b^3 + c^3 - 3abc = -25$.

13. Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)(b + c)(c + a)$.

Answers

1. (i) (c) (ii) (d) (iii) (d) (iv) (d)

2. (i) 0 (ii) -2 (iii) 0

3. (i) (d) (ii) (a) (iii) (a)

4. 61 5. $-\frac{15}{8}$ 6. -15 7. 0 8. 3

9. $-120x^2y - 250y^3$

SECTION A

1. Choose and write the correct option in the following questions.

(4 × 1 = 4)

(i) The equation $x = 4$ in two variables can be written as

(a) $1.x + 1.y = 4$

(b) $x + 0.y = 4$

(c) $0.x + 1.y = 4$

(d) $0.x + 0.y = 4$

(ii) The linear equation $2x - 4y = 8$ has

(a) A unique solution

(b) Two solutions

(c) Infinitely many solutions

(d) No solutions

(iii) The equation $2x + 5y = 7$ has a unique solution if x, y are

[NCERT Exemplar]

(a) Natural numbers

(b) Positive real numbers

(c) Real numbers

(d) Rational numbers

(iv) The graph of the linear equation $2x + 3y = 8$ cuts the x -axis at the point

(a) $\left(\frac{8}{3}, 0\right)$

(b) $(0, 4)$

(c) $(4, 0)$

(d) $\left(0, \frac{8}{3}\right)$

2. Fill in the blanks.

(3 × 1 = 3)

(i) The graph of the line $x = -2$ is parallel to _____ axis and is perpendicular to _____ axis.

(ii) If the line $x + 3y = a$ passes through $(-2, 2)$ then the value of a _____.

(iii) The equation $3x + y = 7$ meets x -axis at the point _____ and y -axis at the point _____.

3. The following questions consist of two statements—Assertion(A) and Reason(R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation for A.

(b) Both A and R are true and R is not the correct explanation for A.

(c) A is true but R is false.

(d) A is false but R is true.

(3 × 1 = 3)

(i) **Assertion(A)** : $x + y = 6$ is the equation of a line passing through the origin.

Reason (R) : Any equation of the form $y = mx$ passes through the origin.

(ii) **Assertion(A)** : The graph of the linear equation $2x + 5y = 10$ meets the y -axis at the point $(0, 2)$.

Reason (R) : Any linear equation $ax + by + c = 0$ meets the y -axis when its x co-ordinate is 0.

(iii) **Assertion (A)** : The point $(b, 3)$ lies on the graph of linear equation $2x - 3y + 11 = 0$ then $b = -1$.

Reason (R) : Any line parallel to y -axis is $x = k$.

SECTION B

■ Solve the following questions.

(3 × 2 = 6)

4. Find the solution of the equation $2x + 3y = 5$

5. If the point $(4, -2)$ lies on the graph of $2x = ay + 3$, then find the value of a .

6. Express y in terms of x and check whether the point $(-3, -2)$ lies on the line or not $3x - 2y + 5 = 0$.

Solve the following questions.

(4 × 3 = 12)

7. Express the following linear equation in the form $ax + by + c = 0$ and indicate the value of a, b and c : $\frac{x}{2} + y - 5 = 0$
8. Solve for x : $3x + 11 + \frac{x}{2} = \frac{-7}{2} + 18$. What will be the graph of the equation?
9. Check by substituting whether $x = -6$ and $y = -3$ is a solution of equation $2(x - 1) - 5y = 1$ or not. Find one more solution. How many more solutions can you find?
10. Draw the graph of the linear equation $2x = y + 3$. At what points the graph of the equation cut the x -axis and the y -axis.

■ Solve the following questions.

(3 × 4 = 12)

11. The cost of petrol in a city is ₹50 per litre. Set up a linear equation with x representing the number of litres and y representing the total cost (in rupees). Also draw its graph.
12. The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express the statement as a linear equation of two variables and draw the graph of the same by taking the constant mass equal to 6 kg. Read from the graph, the force required when the acceleration produced is
 - (i) 6 m/s^2
 - (ii) 5 m/s^2
13. Draw the graph of $x = 3y - 4$. Find the:
 - (i) value of y when $x = -1$.
 - (ii) value of x when $y = 5$.

[NCERT Exemplar]

Answers

1. (i) (b) (ii) (c) (iii) (a) (iv) (c)
2. (i) $y ; x$ (ii) 4 (iii) $\left(\frac{7}{3}, 0\right) (0, 7)$
3. (i) (d) (ii) (a) (iii) (b)
4. $\left(0, \frac{5}{3}\right), \left(\frac{5}{3}, 0\right), \left(2, \frac{1}{3}\right)$ 5. $a = -\frac{5}{2}$ 6. $y = \frac{3x + 5}{2}$, Yes
7. $\frac{x}{2} + y - 5 = 0, a = \frac{1}{2}, b = 1, c = -5$ 8. $x = 1$, the graph is a line parallel to y -axis
9. Yes, $x = 4, y = 1$, infinite 10. $\left(\frac{3}{2}, 0\right), (0, -3)$ 11. $y = 50x$ 12. $x - 6y = 0$ (i) 36N (ii) 30N
13. (i) $y = 1$ (ii) 11

Time allowed: 1 hour

SECTION A

1. Choose and write the correct option in the following questions.

(4 × 1 = 4)

- (i) Point (5, -3) lies in the
 (a) First quadrant (b) Second quadrant
 (c) Third quadrant (d) Fourth quadrant
- (ii) The point at which the two co-ordinate axes meet is called the
 (a) abscissa (b) ordinate (c) origin (d) quadrant
- (iii) If x -coordinate of a point is zero, then this point always lies
 (a) in I quadrant (b) in II quadrant
 (c) on x -axis (d) on y -axis
- (iv) Abscissa of a point is positive in
 (a) I & II quadrant (b) I & IV quadrants
 (c) I quadrant (d) II quadrant only

2. Fill in the blanks.

(3 × 1 = 3)

- (i) Equation of y -axis in _____.
- (ii) Co-ordinate of origin _____.
- (iii) Point (-2, -3) lies in _____ quadrant.

3. The following questions consist of two statements—Assertion(A) and Reason(R). Answer these questions selecting the appropriate option given below:

- (a) Both A and R are true and R is the correct explanation for A.
 (b) Both A and R are true and R is not the correct explanation for A.
 (c) A is true but R is false.
 (d) A is false but R is true.

(3 × 1 = 3)

- (i) **Assertion (A)** : The point which lies on the line $y = 3x$ having abscissa 2 is (2, 6).
Reason (R) : A line parallel to x -axis is $y = k$.
- (ii) **Assertion (A)** : If $a \neq b$, then $(a, b) \neq (b, a)$.
Reason (R) : (-3, 2) lies in quadrant IV.
- (iii) **Assertion (A)** : The point A (-5, 0) lies on x -axis.
Reason (R) : Every point on x -axis is of the form $(x, 0)$.

SECTION B

■ Solve the following questions.

4. Plot the following points and check whether these are collinear or not:

(3 × 2 = 6)

- (i) (2, -4) and (3, 6), and (-1, 2)
 (ii) (1, 1), (2, -3), (-1, -2)

5. Plot the point P less (4, -6) and from it draw PM and PN perpendicular to x -axis and y -axis respectively. Write the coordinates of the points M and N.

6. Plot the points (x, y) given in the following table. Use scale 1 cm = 0.25 units. [NCERT Exemplar]

x	1.25	0.25	1.5	-0.75
y	-0.5	1	1.5	-0.25

Solve the following questions.

(4 × 3 = 12)

- Plot the points $(-3, 0)$, $(5, 0)$ and $(0, 4)$ on Cartesian plane. Name the figure formed by joining these points and find its area.
- In which quadrant or on which axis does each of the following points lie?
 $(-4, 2)$, $(3, -2)$, $(4, 0)$, $(3, 3)$, $(-4, -5)$
- Three vertices of a rectangle are $(-1, 1)$, $(5, 1)$ and $(5, 3)$. Plot these points and find the coordinates of the fourth vertex.
- Find some ordered pairs (x, y) such that $x + 3y = 6$ and plot them. How many such ordered pairs can be found and plotted?

Solve the following questions.

(3 × 4 = 12)

- Write the coordinates of the vertices of a square whose each side is 5 units, one vertex at $(2, 1)$ and all the vertices lie in the same quadrant.
- Draw the quadrilateral with vertices $(-4, 4)$, $(-6, 0)$, $(-4, -4)$, $(-2, 0)$. Name the type of quadrilateral and find its area.
- Plot the points $P(1, 0)$, $Q(4, 0)$ and $S(1, 3)$. Find the coordinates of the point R such that $PQRS$ is a square. [NCERT Exemplar]

Answers

- (i) (d) (ii) (c) (iii) (d) (iv) (b)
- (i) $x = 0$ (ii) $(0, 0)$ (iii) III
- (i) (b) (ii) (c) (iii) (a)
- (i) yes (ii) No
- $M(4, 0)$, $N(0, -6)$
- Triangle; 16 sq. units
- II quadrant, IV quadrant, x -axis, I quadrant, III quadrant
- $(-1, 3)$
- $(0, 2)$, $(6, 0)$, $(3, 1)$; infinite
- $(7, 1)$, $(7, 6)$, $(2, 6)$
- Rhombus, 16 square units
- $(-1, 3)$