Chapter - 1

Practice Exercise
for sure **S**uccess...

Very Short Answer Type Questions (1 Mark)

1. Is the number $(5+\sqrt{3})(5-\sqrt{3})$ rational or irrational?

2. State whether $-1+\sqrt{2}$ lies in the negative or positive side on the number line.

3. Find the value of $\left[\dfrac{16}{81}\right]^{-\frac{3}{4}}$.

4. Rationalise the denominators of the following:

   (i) $\dfrac{1}{\sqrt{5}+\sqrt{2}}$ (ii) $\dfrac{1}{2+\sqrt{3}}$

5. Simplify $\sqrt[4]{\sqrt[3]{2^2}}$.

6. If $a=3$ and $b=5$, then find the value of a^a+b^b.   *[NCERT Exemplar]*

7. What denominator do we obtain after rationalising the denominator of $\dfrac{4}{7\sqrt{5}-5\sqrt{7}}$?

8. Find the value of $\sqrt[3]{343}-\sqrt[3]{216}$.

9. Find an irrational number between $\dfrac{1}{7}$ and $\dfrac{2}{7}$.

10. Write $\dfrac{p}{q}$ form of 1.999...

Short Answer Type-1 Questions (2 Marks)

11. Simplify: (i) $\left(\dfrac{32}{243}\right)^{-\frac{3}{5}}$ (ii) $\sqrt[4]{(256)^{-2}}$

12. What is the value of $\dfrac{\sqrt{162}+\sqrt{108}}{\sqrt{72}+\sqrt{48}}$?   *[HOTS]*

13. If $\sqrt{2}=1.4142$, then find the value of $\sqrt{\dfrac{\sqrt{2}-1}{\sqrt{2}+1}}$.   *[HOTS; NCERT Exemplar]*

14. If $p=3$ and $q=5$, then find the value of $\left[\dfrac{1}{p}+\dfrac{1}{q}\right]^q$.   *[HOTS; NCERT Exemplar]*

15. If $\sqrt{13-p\sqrt{10}}=\sqrt{8}+\sqrt{5}$, then find p.

16. Find the value of x, if $\left(\dfrac{3}{5}\right)^5 \left(\dfrac{5}{3}\right)^{-9} = \left(\dfrac{3}{5}\right)^{2x}$.

17. Show that $(x^{p+q})^{p-q} \times (x^{q+r})^{q-r} \times (x^{r+p})^{r-p} = 1$.

18. Simplify $\dfrac{2^{x+1} + 2^x}{2^{x+1} - 2^x}$.

19. Find the value of x, if $7^{x-3} \times 5^{2x-8} = 1225$.

20. Find two irrational numbers between 0.6 and 0.65.

21. Simplify $64^{\frac{-1}{3}}\left[64^{\frac{1}{3}} - 64^{\frac{2}{3}}\right]$.

Short Answer Type-II Questions (3 Marks)

22. Locate the following numbers on the number line.
   (i) $\sqrt{2}$ (ii) $\sqrt{17}$
   (iii) $\sqrt{7}$ (iv) $\sqrt{11}$

23. If $\sqrt{2} = 1.414$ and $\sqrt{3} = 1.732$, then find the value of $\dfrac{\sqrt{6}-1}{\sqrt{3}}$ upto three places of decimal.

24. If x, y, z are real numbers, show that $\sqrt{x^{-1}y}\sqrt{y^{-1}z}\sqrt{z^{-1}x} = 1$.

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

26. Simplify $\left[\dfrac{5^{-3} \times 7^4}{7^{-2} \times 5^{-6}}\right]^{\frac{5}{2}} \times \left[\dfrac{5^{-3} \times 7^{-3}}{7^5 \times 5^2}\right]^{\frac{3}{2}}$. **[HOTS]**

27. If $a = 6 + 2\sqrt{3}$, find the value of $a - \dfrac{1}{a}$. **[HOTS]**

28. Prove that:
   (i) $\left(\dfrac{1}{4}\right)^{-2} - 3 \times 8^0 - \left(\dfrac{1}{64}\right)^{-\frac{1}{2}} = 5$
   (ii) $\dfrac{2^n + 2^{n-1}}{2^{n+1} - 2^n} = \dfrac{3}{2}$ **[HOTS]**

29. Rationalise the denominator of $\dfrac{6}{3\sqrt{2} - 2\sqrt{3}}$.

30. Express $16.5\overline{23}$ in the form of $\dfrac{p}{q}$, where p, q are integers.

31. If $\sqrt{2} = 1.414$ and $\sqrt{3} = 1.732$, then find the value of $\dfrac{4}{3\sqrt{3} - 2\sqrt{2}} + \dfrac{3}{3\sqrt{3} + 2\sqrt{2}}$.

32. If $a = \dfrac{5 - \sqrt{21}}{2}$, prove that:
   $\left(a^3 + \dfrac{1}{a^3}\right) - 5\left(a^2 + \dfrac{1}{a^2}\right) + \left(a + \dfrac{1}{a}\right) = 0$.

33. Simplify $\dfrac{1}{1 + p^{y-x} + p^{z-x}} + \dfrac{1}{1 + p^{x-y} + p^{z-y}}$
   $+ \dfrac{1}{1 + p^{x-z} + p^{y-z}}$.

34. Prove that: $\dfrac{1}{\sqrt{4} + \sqrt{5}} + \dfrac{1}{\sqrt{5} + \sqrt{6}} + \dfrac{1}{\sqrt{6} + \sqrt{7}}$
   $+ \dfrac{1}{\sqrt{7} + \sqrt{8}} + \dfrac{1}{\sqrt{8} + \sqrt{9}} = 1$

35. If $\dfrac{9^{n+1} \times (3^{-n/2})^{-2} - 27^n}{(3^m \times 2)^3} = \dfrac{1}{729}$, prove that $m - n = 2$.

36. Evaluate $\dfrac{25}{\sqrt{40} - \sqrt{80}}$ after rationalising the denominator given that $\sqrt{2} = 1.414$ and $\sqrt{10} = 3.162$

37. Represent $\sqrt{8.47}$ on the real line.

Long Answer Type Questions (4 Marks)

38. Find the value of a and b if: **[NCERT Exemplar]**
   (i) $\dfrac{\sqrt{7} - 1}{\sqrt{7} + 1} - \dfrac{\sqrt{7} + 1}{\sqrt{7} - 1} = a + b\sqrt{7}$
   (ii) $\dfrac{7 + \sqrt{5}}{7 - \sqrt{5}} - \dfrac{7 - \sqrt{5}}{7 + \sqrt{5}} = a + b\sqrt{5}$

39. If $3^a = 5^{-b} = 15^{\frac{c}{2}}$, then prove that $c = \dfrac{2ab}{b - a}$.

40. Express $0.6 + 0.\overline{7} + 0.\overline{47}$ in the form $\dfrac{p}{q}$, where p and q are integers and $q \neq 0$.

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

42. If $a = 8 + 3\sqrt{7}$ and $b = \dfrac{1}{a}$, then what will be the value of $a^2 + b^2$? **[NCERT Exemplar]**

43. If $x = (2+\sqrt{5})^{1/2} + (\sqrt{5}-2)^{1/2}$ and $y = (2+\sqrt{5})^{1/2} - (\sqrt{5}-2)^{1/2}$ then evaluate $x^2 + y^2$.

44. Simplify the following into a fraction with rational denominator. $\dfrac{1}{\sqrt{5}+\sqrt{6}-\sqrt{11}}$.

45. Simplify
$$\frac{9^{15} + 3.9^{14} + 9^{13}}{3.9^{15} + 9^{14} - 9^{13}} + \frac{4^{15} + 2.4^{14} + 4^{13}}{2.4^{15} + 4^{14} - 4^{13}}$$

46. Show that $\dfrac{(x^{(a+b)})^2 (x^{(b+c)})^2 (x^{(c+a)})^2}{(x^a x^b x^c)^4} = 1$.

47. If $\dfrac{2\sqrt{6}-\sqrt{5}}{\sqrt{45}-\sqrt{24}} = a + b\sqrt{30}$, find the values of a and b.

48. Simplify $\dfrac{\sqrt{a^2-b^2}+a}{\sqrt{a^2+b^2}+b} \div \dfrac{\sqrt{a^2+b^2}-b}{a-\sqrt{a^2-b^2}}$.

49. If $\dfrac{2-\sqrt{5}}{2+3\sqrt{5}} = \sqrt{5}a + b$, find a and b.

50. If $x = \dfrac{1}{7+4\sqrt{3}}$ and $y = \dfrac{1}{7-4\sqrt{3}}$, find the value of $x^3 + y^3$.

Value Based Questions (VBQs)

51. Once a teacher gave students two numbers $\dfrac{1}{3+2\sqrt{2}}$ and $\dfrac{1}{3-2\sqrt{2}}$ to find the value of sum of their squares, the resulting value of sum of squares of number will be equal to toffees given to student who solved it first correctly. Student who got toffees, distributed to all students. What values of teacher and students are showing in this question?

52. Ram's father once asked him, 'Can you write $0.\overline{47}$ in $\dfrac{p}{q}$ form as $\dfrac{47}{100}$? He answered, 'No it is $\dfrac{43}{99}$. Is he correct? Justify his answer. Which value of Ram depicted?

ANSWERS

1. Rational **2.** Positive **3.** $\dfrac{27}{8}$ **4.** (i) $\dfrac{\sqrt{5}-\sqrt{2}}{3}$ (ii) $2-\sqrt{3}$ **5.** $2^{\frac{1}{6}}$ **6.** 3152 **7.** 70 **8.** 1

9. 0.15015001500015... **10.** 2 **11.** (i) $\dfrac{27}{8}$ (ii) $\dfrac{1}{16}$ **12.** $\dfrac{3}{2}$ **13.** 0.4142 **14.** $\dfrac{32768}{759375}$ **15.** -4 **16.** $x = 7$

18. 3 **19.** $x = 5$ **20.** 0.61010010001... and 0.61101001... **21.** -3 **23.** 0.837 **26.** 343

27. $\dfrac{23}{4} + \dfrac{25}{12}\sqrt{3}$ **29.** $3\sqrt{2}+2\sqrt{3}$ **30.** $\dfrac{8179}{495}$ **31.** 2.063 **33.** 1 **36.** 9.5 **38.** (i) $a = 0, b = \dfrac{-2}{3}$

(ii) $a = 0, b = \dfrac{7}{11}$ **40.** $\dfrac{917}{495}$ **41.** 2 **42.** 254 **43.** $4\sqrt{5}$ **44.** $\dfrac{5\sqrt{6}+6\sqrt{5}+\sqrt{330}}{60}$ **45.** $\dfrac{2018}{1757}$

47. $a = \dfrac{3}{7}, b = \dfrac{4}{21}$ **48.** $\dfrac{b^2}{a^2}$ **49.** $a = \dfrac{8}{41}, b = \dfrac{-19}{41}$ **50.** 2702

51. 34, Teacher is encouraging students and student shows sharing nature

52. Yes, he is correct; curiosity and awareness.

Chapter - 2

Practice Exercise
for sure Success...

Very Short Answer Type Questions (1 Mark)

1. Find the value of polynomial $4x^2 - 5x + 9$, when $x = \dfrac{1}{2}$.

2. Find the coefficient of y in the expansion of $(2y - 3)^3$.

3. Find the zeros of the polynomial $p(x) = 4x^2 - 25$.

4. If $49x^2 - b = \left(7x + \dfrac{1}{2}\right)\left(7x - \dfrac{1}{2}\right)$, then find the value of b.

5. If $p(x)$ is a polynomial such that $p\left(-\dfrac{1}{3}\right) = 0$, then find one factor of $p(x)$.

6. What is the remainder when $p(x)$ is divided by $ax - b$?

7. If $p(x) = x^2 - 2\sqrt{2}x + 1$, then find the value of $p(2\sqrt{2})$.

8. Find the value of the polynomial $x^2 - 9$ for $x = 97$. *[NCERT Exemplar]*

9. Find the common factor in the quadratic polynomial $x^2 + 8x + 15$ and $x^2 + 3x - 10$.

[NCERT Exemplar]

10. Write the degree of the polynomial $\sqrt{2}$. *[NCERT Exemplar]*

11. Given $f(x) = 2x^3 + 6x^2 - 2x + 9$, find $f(-1)$.

12. If $y + 1$ is a factor of $y^3 + p$, then write the value of p. *[NCERT Exemplar]*

13. Write the coefficient of x in the expansion of $(x + 3)^3$. *[NCERT Exemplar]*

14. If $(x + 1)$ is a factor of $p(x) = x^{98} + 2x^{37} + p$, then find the value of p. *[NCERT Exemplar]*

15. If $x + \dfrac{1}{x} = 5$, then find the value of $x^2 + \dfrac{1}{x^2}$. *[NCERT Exemplar]*

Short Answer Type-I Questions (2 Marks)

16. If $x^{15} - 199$ is divided by $x - 1$, then find the remainder.

17. What is the value of p if $x + \dfrac{1}{2}$ is a factor of $px^2 - 4px + 3$?

18. If $y^2 - 2y - p = (y - 8)(y + 6)$ for all y, then find the value of p.

19. If $4x^3 + 7x^2 - 3x - 6$ is divided by $x + 1$, then find quotient.

20. By remainder theorem, find the remainder when $3x^4 - 4x^3 - 3x - 1$ is divided by $x + 2$.

21. If $a^2 + \dfrac{9}{a^2} = 31$, what is the value of $a - \dfrac{3}{a}$? *[HOTS]*

22. Find the value of $4x^2 + 9y^2$, if $2x + 3y = 18$ and $xy = 5$. *[HOTS]*

23. Evaluate $(27)^{-\frac{1}{3}}(27)^{-\frac{1}{3}}\left[27^{\frac{1}{3}} - 27^{\frac{2}{3}}\right]$.

24. Factorise $27x^4 + 343x$.

25. If $(x + 3)$ divides $p(x) = x^3 + 4x^2 + 7$ and $q(x) = x^2 - 4x + a$, the remainder in each case is same. Find the value of a. *[HOTS]*

26. Expand the following using suitable identity:

    (i) $\left(\dfrac{3a}{2}+\dfrac{b}{4}-2c\right)^2$ (ii) $\left(\dfrac{3}{x}-\dfrac{y}{3}\right)^3$

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

28. Find $p(0)$, $p(1)$ and $p(-2)$ for following polynomials:

    (i) $p(x)=10x-4x^2-3$ (ii) $p(y)=(y+2)(y-2)$

29. For what value of m is x^3-2mx^2+16 divisible by $x+2$? **[NCERT Exemplar]**

30. Factorise $a^3-2\sqrt{2}b^3$. **[NCERT Exemplar]**

Short Answer Type-II Questions (3 Marks)

31. What must be added to $2x^3-4x+9$ to get $5x^3-13$?

32. Find the value of polynomial $p(x)=8x^3-6x^2-4x+3$, when (i) $x=\sqrt{2}$ (ii) $x=\dfrac{-1}{2}$.

33. Without actually calculating the cubes, find the value of

    $\left(\dfrac{1}{2}x-\dfrac{1}{3}y\right)^3+\left(\dfrac{1}{3}y-\dfrac{1}{4}z\right)^3+\left(\dfrac{1}{4}z-\dfrac{1}{2}x\right)^3$. **[HOTS]**

34. Factorise x^3+3x^2+3x-7.

35. Find $y^2+\dfrac{1}{y^2}$ and $y^4+\dfrac{1}{y^4}$, if $y-\dfrac{1}{y}=9$.

36. If $x-3y-2z=0$, then prove that

    $\dfrac{x^2}{yz}-\dfrac{27y^2}{zx}-\dfrac{8z^2}{xy}=18$. **[HOTS]**

37. Simplify by factorisation method $\dfrac{9-2\sqrt{3}x-x^2}{3-x^2}$.

38. Find the product

    $\left(2a-\dfrac{1}{2a}\right)\left(2a+\dfrac{1}{2a}\right)\left(4a^2+\dfrac{1}{4a^2}\right)\left(16a^4+\dfrac{1}{16a^4}\right)$.

    [HOTS]

39. Using identities, evaluate:

    (i) 88×112 (ii) $(103)^3$

Long Answer Type Questions (4 Marks)

40. Find the values of a and b so that $(z+1)$ and $(z-1)$ are factors of $z^4+az^3+2z^2-3z+b$.

41. Without actual division, prove that $2x^4-5x^3+2x^2-x+2$ is exactly divisible by x^2-3x+2.

    [NCERT Exemplar]

42. Expression x^3+px^2-x+q is completely divided by $(x+1)$ and $(x+2)$. Find the values of p and q.

43. Factorise $r^3(s-t)^3+s^3(t-r)^3+t^3(r-s)^3$.

44. Simplify $\dfrac{(x^3-y^3)^3+(y^3-z^3)^3+(z^3-x^3)^3}{(x-y)^3+(y-z)^3+(z-x)^3}$.

45. If $x^2+\dfrac{1}{x^2}=18$, then find the value of $x^3-\dfrac{1}{x^3}$, using only positive value of $x-\dfrac{1}{x}$.

46. Using identity, evaluate

    $\dfrac{2.8\times2.8\times2.8-1.8\times1.8\times1.8}{2.8\times2.8+2.8\times1.8+1.8\times1.8}$. **[NCERT Exemplar]**

47. Find α and β, if $(x+1)$ and $(x+2)$ are factors of $x^3+3x^2-2\alpha x+\beta$.

48. Factorise a^7-ab^6.

49. Simplify: (i) $\dfrac{x^3-4-x+4x^2}{x^2+3x-4}$,

    (ii) $\dfrac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$

50. When $f(x)=x^4-4x^3+8x^2-ax+b$ is divided by $x-1$ and $x+1$, we get remainder as 10 and 16 respectively. Find the remainder if $f(x)$ is divided by $x-4$.

51. Find value of 'p' and 'q', if (a^2-4) is factor of $pa^4+2a^3-3a^2+qa-4$.

52. Factorise $2x^3-3x^2-17x+30$.

53. Multiply $x^2+4y^2+z^2+2xy+xz-2yz$ by $(-z+x-2y)$.

54. Given a polynomial $p(x)=x^2-5x+4$.

    (i) Find the value of the polynomial $p(x)$ at $x=2$.

    (ii) Check whether 3 is a factor of $p(x)$.

    (iii) Factorise $p(x)$.

55. The polynomial $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $x - 4$ leave the same remainder in each case. Find the value of a.

56. Prove that $2x^3 + 2y^3 + 2z^3 - 6xyz = (x + y + z)$ $[(x - y)^2 + (y - z)^2 + (z - x)^2]$, hence evaluate $2(7)^3 + 2(9)^3 + 2(13)^3 - 6(7)(9)(13)$.

57. Find the value of 'a' if $(x - a)$ is a factor of $x^5 - a^2x^3 + 2x + a + 3$, hence factorise $x^2 - 2ax - 3$.

58. If $z^2 + \dfrac{1}{z^2} = 11$, find the value of $z^3 - \dfrac{1}{z^3}$, using only the positive value of $z - \dfrac{1}{z}$.

59. Prove that $(a + b + c) - a^3 - b^3 - c^3 = 3(a + b)$ $(b + c)(c + a)$. **[NCERT Exemplar]**

Value Based Questions (VBQs)

60. A fruitseller had 94 baskets of apples and each basket had 106 apples. Find total number of apples in 94 baskets. He found that about 18 apples are rotten in each basket so he charged amount from customers for good apples only. What value of fruitseller is depicted in this question?

61. Two friends started a business together. They decided profit in the share of their capital invested. If both invested together ₹ $(6x^2 + 11x - 35)$, find their shares individually. Which mathematical concept is used in this question? What values are showing in this question?

ANSWERS

1. $\dfrac{15}{2}$ 2. 54   3. $\dfrac{5}{2}, \dfrac{-5}{2}$ 4. $\dfrac{1}{4}$ 5. $x + \dfrac{1}{3}$ 6. $p\left(\dfrac{b}{a}\right)$ 7. 1   8. 9400   9. $x + 5$ 10. 0   11. 15   12. 1

13. 27   14. 1   15. 23   16. –198   17. – 4/3   18. 48   19. $4x^2 + 3x - 6$ 20. 85   21. 5   22. 264   23. $\dfrac{-2}{3}$

24. $x(3x + 7)(9x^2 - 21x + 49)$ 25. $a = -5$ 26. (i) $\dfrac{9a^2}{4} + \dfrac{b^2}{16} + 4c^2 + \dfrac{3ab}{4} - bc - 6ca$ (ii) $\dfrac{27}{x^3} - \dfrac{y^3}{27} - \dfrac{9y}{x^2} + \dfrac{y^2}{x}$

27. $a = 1$ 28. (i) $p(0) = -3$, $p(1) = 3$, $p(-2) = -39$ (ii) $p(0) = -4$, $p(1) = -3$, $p(-2) = 0$ 29. $m = 1$

30. $(a - \sqrt{2}b)(a^2 + \sqrt{2}ab + 2b^2)$ 31. $3x^3 + 4x - 22$ 32. (i) $12\sqrt{2} - 9$ (ii) $\dfrac{5}{2}$

33. $3\left(\dfrac{1}{2}x - \dfrac{1}{3}y\right)\left(\dfrac{1}{3}y - \dfrac{1}{4}z\right)\left(\dfrac{1}{4}z - \dfrac{1}{2}x\right)$ 34. $(x - 1)(x^2 + 4x + 7)$ 35. (i) 83 (ii) 6887   37. $\dfrac{x + 3\sqrt{3}}{x + \sqrt{3}}$

38. $256a^8 - \dfrac{1}{256a^8}$ 39. (i) 9856 (ii) 1092727   40. $a = 3$, $b = -3$ 42. $p = 2$, $q = -2$ 43. $3rst(s - t)(t - r)(r - s)$

44. $(x^2 + y^2 + xy)(y^2 + z^2 + yz)(z^2 + x^2 + zx)$ 45. 76   46. 1   47. $\alpha = -1$, $\beta = 0$

48. $a(a - b)(a + b)(a^2 - ab + b^2)(a^2 + b^2 + ab)$ 49. (i) $(x + 1)$ (ii) $(a + b)(b + c)(c + a)$ 50. $a = -1$, $b = 4$; 136

51. $p = 1$ and $q = -8$ 52. $(x - 2)(x + 3)(2x - 5)$ 53. $x^3 - 8y^3 - z^3 - 6xyz$ 54. (i) –2 (ii) No   (iii) $(x - 4)(x - 1)$

55. $a = 1$ 56. 1624   57. $a = -1$ and $(x + 3)(x - 1)$ are factors   58. 36   60. 9964, honesty   61. $(2x + 7)$ and $(3x - 5)$; middle term splitting; cooperation, proper sharing in profit and mutual understanding.

Practice Exercise
for sure **Success..**
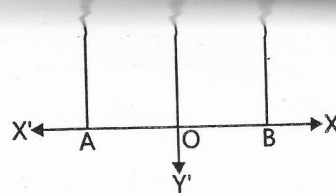
Very Short Answer Type Questions (1 Mark)

1. If two ordered pairs $(x, 3)$ and $(-4, y)$ are equal, then find the value of x and y. **[NCERT Exemplar]**

2. Write the abscissa of all the points lie on Y-axis. **[NCERT Exemplar]**

3. Write the quadrant in which point $(-3, 3)$ lies. **[NCERT Exemplar]**

4. Write the equation of the graph X'OX.

5. Write the equation of the graph Y'OY.

6. On plotting the points $O(0, 0)$, $A(3, 0)$, $B(3, 4)$, $C(0, 4)$ and joining OA, AB, BC and CO, name the figure which is obtained.

7. Find the perpendicular distance of the point $P(3, 4)$ from Y-axis.

8. If perpendicular distance of a point from the X-axis be 8 units along the negative direction of Y-axis, then find the ordinate of point P.

9. Find the distance of the point $P(4, 3)$ from the origin.

10. Find the area of the figure obtained on joining points $L(0, 4)$, $M(4, 4)$, $N(4, 0)$ and $O(0, 0)$. **[NCERT Exemplar]**

11. Name the quadrant in which a point will lie, if both of whose coordinates are negative.

12. Write the coordinate of a point whose ordinate is $\frac{-1}{2}$ and abscissa is 1. **[NCERT Exemplar]**

Short Answer Type-I Questions (2 Marks)

13. In figure, ABCD is a square with each side 6 cm, O is the mid-point of AB. Find the coordinate of A, B, C, D. **[HOTS]**
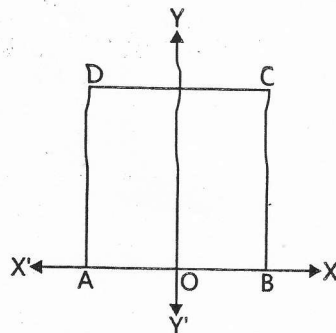
14. Which of the following points lies on X-axis? Which on Y-axis? $A(0, 2)$, $B(5, 6)$, $C(-3, 0)$, $D(0, -3)$, $E(0, 4)$, $F(6, 0)$, $G(3, 0)$.

15. In which quadrant do the following points lie?
    (a) $(2, -1)$ (b) $(-1, 7)$ (c) $(-2, -3)$ (d) $(4, 5)$

16. Plot the points $A(0, 3)$, $B(5, 3)$, $C(4, 0)$ and $D(-1, 0)$ on the graph paper. Identify the figure ABCD and find whether the point $(2, 2)$ lies inside the figure or not?

17. Plot the points $A(-3, 3)$, $B(3, -3)$, $C(3, 3)$, $D(-3, 3)$ in the cartesian plane. Also, find the length of line segment AB.

18. The length of perpendiculars PM and PN drawn from a point P, on X-axis and Y-axis are of 3 and 2 units. Find the coordinates of points P, M and N. **[HOTS]**

19. Plot the points
$$\left(\frac{-3}{2}, 0\right), \left(\frac{-3}{2}, 3\right), \left(0, \frac{15}{2}\right), \left(\frac{3}{2}, 3\right) \text{ and } \left(\frac{3}{2}, 0\right).$$
Join them and name the figure.

20. Locate the points P (2, 4), Q (7, 4), R (7, 6) and S (2, 6) on graph paper. Join them and name the figure so formed.

21. If the perpendicular distance of a point P from the X-axis is 5 units and the foot of the perpendicular lies on the negative direction of X-axis, find the y-coordinate of point P. **[HOTS]**

Short Answer Type-II Questions (3 Marks)

22. If the points (−3, a) and (b, 4) lie on the straight line with equation $y = 4x$, find the value of a and b.

23. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, find the value of a.

24. Does the point (−3, −3) lie on the line $x = y$? Justify your answer.

25. If the coordinates of the two points are A(−2, 5) and B(−7, 8), then find (abscissa of B) − (abscissa of A).

26. The distance of a point from X-axis is 3 units and from Y-axis is 5 units. If the point lies in third quadrant, find the coordinates of the point.

27. Plot the point P (4, −6) and from it draw PM and PN perpendicular to X-axis and Y-axis respectively and find the coordinates of points M and N.

28. Plot the points P (−2, 1), Q (2, 1), R (3, 2) and S (−1, 2) and write the name of the figure thus obtained.

29. 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.

30. A point lies on the X-axis at a distance 5 units from Y-axis on the right of the origin. What are its coordinates? What will be the coordinates if it lies on the Y-axis at a distance of 5 units from X-axis below the origin? If joining these points in both condition, then find the distance between them. **[HOTS]**

31. Find coordinates of the point: **[HOTS]**
    (i) which lies on both the axes.
    (ii) whose abscissa is −4 and lies on X-axis.
    (iii) whose ordinate is 5 and lies on Y-axis.

32. Plot the point P(2, −6) on the graph paper and from it draw PM and PN perpendiculars to X-axis and Y-axis. Write the coordinates of the point M and N. Also find the distance between them. **[HOTS]**

33. Plot the points A(4, 0) and B(0, 4). Join A, B to the origin O. Find the area of △ AOB. **[HOTS]**

Long Answer Type Questions (4 Marks)

34. Plot the points P(2, 0), Q(5, 0) and S(2, 3). Find the coordinates of the points R such that PQRS is square.

35. Three vertices of rectangle are (−1, 1), (5, 1) and (5, 3). Plot these points and find the coordinates of the fourth vertex.

36. Find some ordered pairs (x, y) such that $x + 3y = 6$, and plot them. How many such ordered pairs can be plotted and found?

37. Write the coordinate of the vertices of a square whose each side is 5 units, one vertex at (2, 1) and all the vertex lie in the same quadrant. Also write the name of quadrant.

38. Draw the quadrilateral with vertices (−4, 4), (−6, 0), (−4, −4), (−2, 0). Name the type of quadrilateral and find its area.

Value Based Questions (VBQs)

39. On Independence day, a teacher marked four points O(0, 0), A(6, 0), B(6, 5) and C(0, 5) on the ground. He said students to decorate boundary formed by joining these points with the flowers to make a beautiful stage. What shape is obtained? What values of a teacher and students are depicting in this question?

40. On New Year, students of a school thought to make New Year cards to give teachers and their parents. They decorate a figure on the cards which is formed by joining the points (−4, 4), (−6, 0), (−4, −4) and (−2, 0). Find the area and perimeter of figure so obtained. Mention the values of students in this question.

ANSWERS

1. $x = -4, y = 3$ 2. 0 3. II Quadrant 4. $y = 0$ 5. $x = 0$ 6. Rectangle 7. 3 8. -8 9. 5 units

10. 16 sq. units 11. III Quadrant 12. $\left(1, -\dfrac{1}{2}\right)$ 13. A(-3, 0), B(3, 0), C(3, 6) and D(-3, 6) 14. On X-axis C, F, G and Y-axis, A, D, E 15. (a) IV Quadrant (b) II Quadrant (c) III Quadrant (d) I Quadrant 16. Parallelogram, (2, 2) lies inside the figure 17. 6 units 18. P(2, 3), M(2, 0), N(0, 3) 19. Pentagon 20. Rectangle

21. 5 or -5 22. $a = -12, b = 1$ 23. $a = \dfrac{5}{3}$ 24. Yes 25. -5 26. (-5, -3) 27. M(4, 0), N(0, -6)
28. Parallelogram 29. Triangle; 16 sq. units 30. (5, 0), (0, -5); $5\sqrt{2}$ units 31. (i) (0, 0) (ii) (-4, 0) (iii) (0, 5)
32. M(2, 0), N(0, -6); $2\sqrt{10}$ units 33. 8 sq. units 34. (5, 3) 35. (-1, 3) 36. Infinitely many, (0, 2), (6, 0), (3, 1)
37. (7, 1), (7, 6), (2, 6); I quadrant 38. Rhombus; 16 sq. units
39. Rectangle; teacher wants to clear the concept of coordinate and unite the students; Students show their cooperation 40. 16 sq. units; $12\sqrt{2}$ units; creative work and way to show respect and honour.
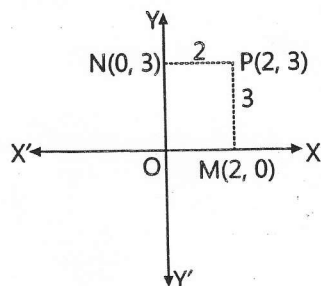
Hints of Selected Questions

9. $d = \sqrt{4^2 + 3^2} = \sqrt{16 + 9} = \sqrt{25} = 5$ sq. units

10. Area of figure = Area of square
$= (4)^2 = 16$ sq. units.

16. By plotting the point (2, 2) on graph paper, we will check whether this point lie in the figure or not.

17. Length of AB = $|-3| + |3| = 3 + 3 = 6$ units

18.

21. Area of $\triangle AOB = \dfrac{1}{2} \times OA \times OB = \dfrac{1}{2} \times 4 \times 4$
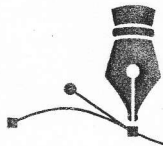$= 8$ sq. units

22. At point (-3, a);
$a = 4\,(-3) \Rightarrow a = -12$
At point (b, 4);
$4 = 4 \times b \Rightarrow b = 1$

29. Area of triangle $= \dfrac{1}{2} \times 8 \times 4 = 16$ sq. units

30. Distance between the points
$= \sqrt{(5)^2 + (5)^2} = \sqrt{25 + 25} = 5\sqrt{2}$ units

32. Distance between the points
$= \sqrt{6^2 + 2^2} = \sqrt{36 + 4} = \sqrt{40} = 2\sqrt{10}$ units

38. Area of rhombus $= \dfrac{1}{2} \times d_1 \times d_2 = \dfrac{1}{2} \times 4 \times 8$
$= 16$ sq. units

TEST YOURSELF

Time: 2 hrs. **Max. Marks: 50**

Very Short Answer Type Questions (1 Mark)

1. Check whether the equation $x(x-2)-2x+y+8=0$ is a linear equation or not.

2. Write the equation $y=3$ in the standard form of linear equation in two variables.

3. Write the equation $\frac{2}{3}x-y=\frac{7}{5}$ in the form of $ax+by+c=0$. Also find the values of a, b and c.

4. How many solution(s) of the linear equation $y=5x+8$ has?

5. If the point $(2, -1)$ lies on $2x+ky=3$, then find the value of k.

Short Answer Type-I Questions (2 Marks)

6. Which of the following is a solution of the equation $2x-3y=5$?

   (i) $(-2, -3)$ (ii) $(4, 6)$

7. At what point the graph of the linear equation $-2x+y=10$ cuts the Y-axis?

8. Write any two solutions of $3x-2y=6$.

9. Draw the graph of the equation $x+3y=15$. From the graph, find the value of y, when $x=3$.

10. Give the geometric representation of $x=-3\frac{1}{2}$ as equation in one variable.

Short Answer Type-II Questions (3 Marks)

11. Give the geometric representation of $x=6$ as an equation:

    (i) in one variable   (ii) in two variables

12. *Find the value of k, so that $(1, -1)$ is the solution of $2x+ky=19$. Find two more solutions of* the given equation.

13. Draw the graph of the equation $\frac{x}{5}+\frac{y}{10}=1$. Also, find the area of the triangle formed by the line and the coordinate axes.

14. How many solution(s) of the linear equation $2y+3=5y-8$ are there on the:

    (i) Number line   (ii) Cartesian plane

15. Draw a triangle whose sides are represented by $x=0$, $y=0$ and $x+y=8$ in the cartesian plane. Also find the coordinates of the vertices.

Long Answer Type Questions (4 Marks)

16. Draw the graph of the following equations on the same graph paper: $x - y = 0$, $x + y = 0$, $y = 0$ and $x = 2$. Also, find the area enclosed between these lines.

17. The cost of a calculator is ₹ 500. Write a linear equation, when the cost of x calculators is ₹ y. Draw the graph of this equation. Also find the cost of 15 such calculators from the graph.

18. I am three times as old as my daughter. 5 years later, I shall be two and half times as old as my daughter. Taking my age as x years and age of my daughter as y years. Write the linear equations so formed. Draw graph and find the ages of both.

19. Draw the graph of the equation $\frac{1}{2}(y-5)+6 = \frac{3}{5}(y+5)+2$ on the cartesian plane. Explain the number of solution(s) and find the coordinate of point where graph cuts the Y-axis.

20. On Independence day, Jogeshwar distributed *ladoos* in worker's colony. He distributed 2 ladoos to each. Taking number of workers as x and total *ladoos* distributed as y.

    (i) Form a linear equation.

    (ii) From graph, find number of workers if he distributed 200 *laddos*.

    (iii) What value is depicted by Jogeshwar in this question?

ANSWERS

1. Not 2. $0 \cdot x + y - 3 = 0$ 3. $\frac{2}{3}x - y - \frac{7}{5} = 0, a = \frac{2}{3}, b = -1, c = \frac{-7}{5}$ 4. Infinite solutions 5. $k = 1$

6. (i) Yes (ii) No 7. (0, 10) 8. (0, –3), $\left(1, \frac{-3}{2}\right)$ 9. $y = 4$ 12. $k = -17$, $\left(0, \frac{-19}{17}\right)$, (1, –1) 13. 25 sq. units

14. (i) Only one solution (ii) Infinitely many solutions 15. (0, 8), (0, 0), (8, 0) 16. 4 sq. units 17. ₹ 7500
18. $x - 3y = 0$ and $2x - 5y - 15 = 0$; 45 yrs, 15 yrs 19. Infinitely many solutions, (0, –15)
20. (i) $y = 2x$ (ii) 100 (iii) Sense of sharing, patriotism, cooperation.