Qus. 17. **Find two rational numbers between $\frac{1}{5}$ and $\frac{1}{5}$.** (2023)

Sol. : [**Note :** *Solve as Q. 2. on page 2*] [**Ans.** $\frac{2}{3}, \frac{11}{15}$]

Qus. 18. **Find the value of $(9)^{1/2}$.** (2023)

Sol. : $(9)^{1/2} = (3^2)^{1/2} = 3^{2 \times \frac{1}{2}} = 3$. **Ans.**

Objective Questions

Multiple Choice Questions

1. **Every rational number is :** (2023)
   (a) a natural number (b) an integer
   (c) a real number (d) a whole number.

2. **Between two rational number is :**
   (a) There is no rational number
   (b) There is exactly one rational number
   (c) There are infinitely many rational numbers
   (d) There are only rational numbers and no irrational number.

3. **Decimal representation of a irrational number can not be :**
   (a) terminating (b) non-terminating
   (c) non-terminating repeating (d) non-terminating non-repeating.

4. **The product of any two irrational numbers is :**
   (a) always an irrational number (b) always a rational number
   (c) always an integer (d) sometimes rational sometimes irrational.

5. **The decimal expansion of $\sqrt{2}$ is :**
   (a) a finite decimal (b) 1·41421
   (c) non-terminating recurring (d) non-terminating non-recurring.

6. **Which of the following is an irrational ?**
   (a) $\sqrt{\frac{4}{9}}$ (b) $\frac{\sqrt{12}}{\sqrt{3}}$ (c) $\sqrt{7}$ (d) $\sqrt{81}$.

7. **Which of the following is irrational ?**
   (a) 0·14 (b) $0 \cdot 14\overline{16}$
   (c) $0 \cdot \overline{1416}$ (d) 0·4014001400014 .... .

8. **A rational number between $\sqrt{2}$ and $\sqrt{3}$ is :**
   (a) $\frac{\sqrt{2}+\sqrt{3}}{2}$ (b) $\frac{\sqrt{2} \times \sqrt{3}}{2}$ (c) 1·5 (d) 1·8.

9. The value of $1{\cdot}999\ldots$ in the form of p/q, where p and q are integers and $q \neq 0$ is :
(a) $\frac{19}{10}$ (b) $\frac{1999}{1000}$ (c) 2 (d) $\frac{1}{9}$.

10. $2\sqrt{3}+\sqrt{3}$ is equal to :
(a) $2\sqrt{6}$ (b) 6 (c) $3\sqrt{3}$ (d) $4\sqrt{6}$.

11. $\sqrt{10}\times\sqrt{15}$ is equal to :
(a) $6\sqrt{5}$ (b) $5\sqrt{6}$ (c) $\sqrt{25}$ (d) $10\sqrt{5}$.

12. The number obtained on rationalising the denominator of $\frac{1}{\sqrt{7}-2}$:
(a) $\frac{\sqrt{7}+2}{3}$ (b) $\frac{\sqrt{7}-2}{3}$ (c) $\frac{\sqrt{7}+2}{5}$ (d) $\frac{\sqrt{7}+2}{45}$.

13. $\frac{1}{\sqrt{9}-\sqrt{8}}$ is equal to :
(a) $\frac{1}{2}(3-2\sqrt{2})$ (b) $\frac{1}{3+2\sqrt{2}}$ (c) $3-2\sqrt{2}$ (d) $3+2\sqrt{2}$.

14. After rationalising the denominator of $\frac{7}{3\sqrt{3}-2\sqrt{2}}$, we get the denominator as :
(a) 13 (b) 19 (c) 5 (d) 35.

15. The value of $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$ is equal to :
(a) $\sqrt{2}$ (b) 2 (c) 4 (d) 8.

16. If $\sqrt{2}=1{\cdot}4142$, then $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}}$ is equal to :
(a) 2·4142 (b) 5·8282 (c) 0·4142 (d) 0·1718.

17. $\sqrt[4]{\sqrt[3]{2^2}}$ is equal to :
(a) $2^{-1/6}$ (b) 2^{-6} (c) $2^{\frac{1}{6}}$ (d) 2^6.

18. The product $\sqrt[3]{2}\times\sqrt[4]{2}\times\sqrt[12]{32}$ is equal to :
(a) $\sqrt{2}$ (b) 2 (c) $\sqrt[2]{2}$ (d) $\sqrt[12]{32}$.

19. The value of $\sqrt[4]{(81)^{-2}}$ is :
(a) $\frac{1}{9}$ (b) $\frac{1}{3}$ (c) 9 (d) $\frac{1}{81}$.

20. The value of $(256)^{0\cdot16}\times(256)^{0\cdot09}$ is :
(a) 4 (b) 16 (c) 64 (d) 256·25.

21. Which of the following is equal to x ?
(a) $x^{12/7}-x^{5/7}$ (b) $\sqrt[12]{(x^4)^{1/3}}$ (c) $(\sqrt{x^3})^{2/3}$ (d) $x^{12/7}\times x^{7/12}$.

22. The value of $64^{1/2}$ is : (2020)
(a) 8 (b) 6 (c) 4 (d) 16.

23. Absolute value of any real number is a : (2018)
(a) Natural Number (b) Rational Number
(c) Negative Number (d) Positive Number.

24. Which is not rational number ? (2019)
(a) $\sqrt{23}$ (b) $\sqrt{225}$ (c) $\sqrt{49}$ (d) $5{\cdot}\overline{328}$.

25. Which of the following is an irrational number ? (2019)
(a) 0·23 (b) 0·2023002300023.....
(c) $0{\cdot}23\overline{25}$ (d) $0{\cdot}\overline{2325}$.

26. $a^m \times a^n$ is equal to : (2019)
(a) a^{m+n} (b) a^{mn} (c) a^{m-n} (d) $a^{m/n}$.

27. In the given figure, fraction form of shaded portion will be : (2022)

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$.

28. $\boxed{10}\times\boxed{9}=\boxed{15}\times\boxed{?}$. The number in blank box will be : (2022)
(a) 15 (b) 9 (c) 10 (d) 6.

Ans. : 1. (c), 2. (c), 3. (d), 4. (d), 5. (d), 6. (c), 7. (d), 8. (c), 9. (c), 10. (c), 11. (b), 12. (a), 13. (d), 14. (b), 15. (b), 16. (c), 17. (c), 18. (b), 19. (a), 20. (a), 21. (c), 22. (a), 23. (d), 24. (a), 25. (b), 26. (a), 27. (a), 28. (d).

● Fill in the Blanks

1. The value of $9^{1/2}$ is ..... . (2020)
2. The numbers which can be expressed with form p/q, where p and q are integers but $q \neq 0$ are called ..... .
3. The numbers which cannot be expressed with form p/q, where p and q are integers but $q \neq 0$ are called ..... .
4. There are ..... rational numbers between two rational numbers. (2019)
5. There are ..... irrational numbers between two irrational numbers.
6. Surd power of $3\sqrt{5}$ is ..... . (2018)
7. The smallest natural number is ..... . (2019)
8. The sum of a rational number and an irrational number will be ..... number. (2022)
9. π (pie) is ..... number. (2022)

Ans. : 1. Three (3), 2. rational numbers, 3. irrational numbers, 4. infinitely many, 5. infinitely many, 6. five (5), 7. one (1), 8. irrational, 9. irrational.

● Match the Columns

I. Column 'A'	Column 'B'
1. $(-3)(-4)$	(2020) (a) $\frac{1}{10}$
2. $\frac{1}{100}$	(2020) (b) a^{m-n}
3. $8^{-1/3}$	(2019) (c) 12
4. 0·1	(2020) (d) 0·01
5. $-5+2$	(2020) (e) $\frac{1}{2}$
6. $a^m \div a^n$	(2023) (f) -3

Ans. : 1. → (c), 2. → (d), 3. → (e), 4. → (a), 5. → (f), 6. → (b).

II. Column 'A' | Column 'B'

Column 'A'	Column 'B'
1. $-6+19$	(2020) (a) 0·02
2. $\frac{1}{6}\times 618$	(2020) (b) $\frac{2}{6}$
3. $\frac{1}{4}+\frac{1}{4}$	(2020) (c) 13
4. $\frac{2}{100}$	(2020) (d) 103
5. $\frac{1}{3}$	(2020) (e) 0·5

Ans. : 1. → (c), **2.** → (d), **3.** → (e), **4.** → (a), **5.** → (b).

III. Column 'A' | Column 'B'

Column 'A'	Column 'B'
1. $(0\cdot5)\times(7\cdot4)$	(2022) (a) -28
2. $(-7)\times(-15)$	(2022) (b) $-0\cdot72$
3. $\frac{504}{-18}$	(2022) (c) 43
4. $\frac{0\cdot04}{10}$	(2022) (d) 105
5. $42\cdot64+0\cdot36$	(2022) (e) 3·7
6. $\frac{-18}{25}$	(2022) (f) 0·004

Ans. : 1. → (e), **2.** → (d), **3.** → (a), **4.** → (f), **5.** → (c), **6.** → (b).

• True/False

1. $\sqrt{3}$ is an irrational number. (2020)
2. $\sqrt{5}$ is a rational number. (2020)
3. Every whole number is an integer. (2020)
4. Each real number is rational number.
5. Each irrational number is real numbers.
6. $\frac{32}{48}$ is an equivalent rational number of $\frac{2}{3}$. (2019)
7. $\sqrt{2}$ is a rational number. (2019)

Ans. : 1. True, **2.** False, **3.** True, **4.** False, **5.** True, **6.** True, **7.** False.

• Answer in One Word/Sentence

1. Write the simplest form of $a^m \times a^n$.
2. Write the simplest form of $a^n \times b^n$.
3. Write the simplest form of $a^m \div a^n$.
4. What is the value of a^0.
5. What will be decimal form of fraction $\frac{1}{7}$? (2020)
6. Write the value of $\sqrt{3}$. (2019)

Ans. : 1. a^{m+n}, **2.** $(ab)^n$, **3.** a^{m-n}, **4.** 1 (one), **5.** 0·142 ...., **6.** 1.732 ..... .

Objective Questions

Multiple Choice Questions

1. **Which one of the following is a polynomial :** (2019)

(a) $\frac{x^2}{2}-\frac{2}{x^2}$ (b) $\sqrt{2x}-1$ (c) $x^2+\frac{3x^{3/2}}{\sqrt{x}}$ (d) $\frac{x-1}{x+1}$.

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

(a) 2 (b) 0 (c) 1 (d) 1/2.

3. **Degree of the polynomial $4x^4+10x^3+5x^5+5x+7$ is :** (2023)

(a) 4 (b) 5 (c) 3 (d) 7.

4. **Degree of the zero polynomial is :**

(a) 0 (b) 1 (c) any natural number (d) not defined.

5. **If $p(x)=x^2-2\sqrt{2}\ x+1$ then $p(2\sqrt{2})$ is equal to :**

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

6. **The value of polynomial $5x-4x^2+3$ when $x=-1$ is :**

(a) -6 (b) 6 (c) 2 (d) -2.

7. **If $p(x)=x+3m$, then $p(x)+p(-x)$ is equal to :**

(a) 3 (b) $2x$ (c) 0 (d) 6.

8. **Zero of zero polynomial is :**

(a) 0 (b) 1 (c) any real number (d) not defined.

9. **Zero of the polynomial $p(x)=2x+5$ is :**

(a) $-2/5$ (b) $-5/2$ (c) 2/5 (d) 5/2.

10. **One of the zeros of the polynomial $2x^2+7x-4$ is :**

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

11. **If $x+1$ is a factor of the polynomial $2x^2+kx$, then the value of k is :**

(a) -3 (b) 4 (c) 2 (d) -2.

12. **$(x+1)$ is a factor of polynomial :**

(a) x^3+x^2-x+1 (b) x^3+x^2+x+1

(c) $x^4+x^3+x^2+1$ (d) $x^4+3x^3+3x^2+x+1$.

13. **One of the factors of $(25x^2-1)+(1+5x)^2$ is :**

(a) $5+x$ (b) $5-x$ (c) $5x-1$ (d) $10x$.

14. **The value of 249^2-248^2 is :**

(a) 1^2 (b) 477 (c) 487 (d) 497.

15. **The factorisation of $4x^2+8x+3$ is :**

(a) $(x+1)(x+3)$ (b) $(2x+1)(2x+3)$

(c) $(2x+2)(2x+5)$ (d) $(2x-1)(2x-3)$.

16. **Which of the following is a factor of $(x+y)^3-(x^3+y^3)$:**

(a) x^2+y^2+2xy (b) x^2+y^2-xy (c) xy^2 (d) $3xy$.

17. **The coefficient of x in the expansion of $(x+3)^3$:**

(a) 1 (b) 9 (c) 18 (d) 27.

18. **If $\frac{x}{y}+\frac{y}{x}=-1$ $(x, y\neq 0)$, then value of x^3-y^3 is :**

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

19. If $49x^2 - b = \left(7x + \frac{1}{2}\right)\left(7x - \frac{1}{2}\right)$, then value of b is :
(a) 0 (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$.

20. If $a + b + c = 0$, then $a^3 + b^3 + c^3$ is equal to :
(a) 0 (b) abc (c) $3abc$ (d) $2ab$.

21. If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x, then the value of k is :
(a) 1 (b) -1 (c) 5 (d) 3.

22. The value of polynomial $5x - 4x^2 + 3$ when $x = 2$ is :
(a) 10 (b) -3 (c) 12 (d) 3.

23. If one factor of polynomial $x^2 + x - 6$ is $(x - 2)$, then the other factor is :
(a) $(x + 3)$ (b) $(x + 2)$ (c) $(x - 3)$ (d) $(x - 2)$.

24. If one factor of polynomial $x^2 - 11x + 10$ is $(x - 1)$, then the other factor is
(a) $(x + 10)$ (b) $(x - 10)$ (c) $(x - 11)$ (d) $(x + 11)$.

25. If one factor of polynomial $x^2 - 10x - 24$ is $(x + 2)$, then the other factor is
(a) $(x + 12)$ (b) $(x - 12)$ (c) $(x + 8)$ (d) $(x - 8)$.

26. The polynomial of degree 1 (one) is called :
(a) Quadratic (b) Cubic (c) Binomial (d) Linear.

27. Classify the polynomial $p(x) = x + x^2 + 2$ is :
(a) Monomial (b) Binomial
(c) Trinomial (d) None of these.

28. Degree of polynomial $x^5 - 4x^2 + 2$ is :
(a) 4 (b) 2 (c) 5 (d) 1.

29. The zero of polynomial $p(x) = 2x + 5$ is :
(a) $-\frac{2}{5}$ (b) $-\frac{5}{2}$ (c) $\frac{2}{5}$ (d) $\frac{5}{2}$.

30. Coefficient of x in polynomial $x^2 - x + 4$ is :
(a) 1 (b) 2 (c) -1 (d) 4.

31. The degree of polynomial $4x^2 + 5x + 7$ is :
(a) 2 (b) 3 (c) 7 (d) 5.

32. Linear polynomial is :
(a) $3x + 5$ (b) $4x^3 + 5x$ (c) $4x^2 + 6x + 7$ (d) $x^{32} + 15$.

33. Zeros of polynomial $p(x) = 3x - 2$ is :
(a) $-\frac{2}{3}$ (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) 0.

Ans. : 1. (c), 2. (b), 3. (b), 4. (d), 5. (b), 6. (a), 7. (d), 8.
9. (b), 10. (b), 11. (c), 12. (b), 13. (d), 14. (d), 15. (b), 16.
17. (d), 18. (c), 19. (c), 20. (c), 21. (c), 22. (b), 23. (a), 24.
25. (b), 26. (d), 27. (c), 28. (c), 29. (b), 30. (c), 31. (a), 32.
33. (b).

• Fill in the Blanks

1. The factors of $x^2 - y^2$ are ..... .
2. In a polynomial the highest exponent of the variable is called ..... of polynomial.
3. If in a algebraic expression having many terms in the power form of variable called ..... .
4. The exponent of the variable in each term of a polynomial is always a .....

5. The degree of non-zero constant is always ..... .
6. In the linear polynomial the highest power of variable is ..... . (2019)
7. Coefficient of x^3 in $3x^3$ is ..... . (2018)
8. The coefficient of x^2 in polynomial $x^3 - x^2 + 1$ is ..... . (2019, 20, 23)
9. If $a + b + c = 0$, then $a^3 + b^3 + c^3 =$ ..... . (2020)
10. Zero of polynomial $x + 2$ is ..... . (2020)
11. The coefficient of x^2, in the polynomial $x^2 + 2x + 5$ is ..... . (2022)

Ans. : 1. $(x + y)(x - y)$, 2. degree, 3. polynomial, 4. whole number, 5. zero (0), 6. one (1), 7. three (3), 8. -1, 9. $3abc$, 10. -2, 11. 1 (one).

• Match the Columns

Column 'A'	Column 'B'
1. $x^2 - y^2$	(2023) (a) -1
2. $x^3 + y^3$	(2019) (b) $(x + y)(x - y)$
3. $x^3 - y^3$	(2019) (c) $(x + y) \times (x^2 - xy + y^2)$
4. Zero of polynomial $(x + 1)$	(2019) (d) $(x - y) \times (x^2 + xy + y^2)$
5. Power of polynomial $x^2 + x + 5$	(2019) (e) 2

Ans. : 1. → (b), 2. → (c), 3. → (d), 4. → (a), 5. → (e).

• True/False

1. Polynomial 7 is a monomial.
2. The degree of zero polynomial is always zero.
3. The degree of $x^5 - x^4 + 3$ is 5.
4. The degree of non-zero constant is not defined.
5. Polynomial $7x^3$ is a cubic polynomial.
6. $3x^2 + 5$ is a linear polynomial.
7. LCM × HCF = Multiplication of polynomials. (2018)
8. Polynomial $x^2 + 2x + 3$ is a binomial. (2019)
9. Coefficient of x^2 is the polynomial $7x^2 + 3x + 5$ is 5. (2019)
10. A polynomial of degree one is called a linear polynomial. (2022)

Ans. : 1. True, 2. False, 3. True, 4. False, 5. True, 6. False, 7. True, 8. False, 9. False, 10. True.

• Answer in One Word/Sentence

1. Name the polynomial in which all the coefficients are zero.
2. Name the polynomial having only one term.
3. Name the polynomial having only two terms.
4. Name the polynomial having only three terms.
5. Name the polynomial whose degree is one.
6. Write the degree of polynomial $2 - y^2 - y^3 + 2y^8$. (2020)
7. Write an example of degree two polynomial. (2020)
8. Give one example of monomial of degree 100. (2023)
9. What will be the degree of linear polynomial ?

Ans. : 1. Zero polynomial, 2. Monomial, 3. Binomial, 4. Trinomial, 5. Linear polynomial, 6. Eight (8), 7. $ax^2 + bx + c$, 8. ax^{100}, 9. one.

Qus. 9. According to given figure :
(i) Write the co-ordinate of point *D*.
(ii) Write the co-ordinate of point *F*.

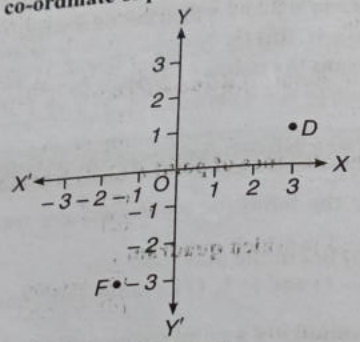

Fig. 3.10

Ans. : **(i)** The required co-ordinate of point D is (3, 1) and

(ii) The co-ordinate of point F is $(\frac{-3}{2}, -3)$.

Objective Questions

• Multiple Choice Questions

1. Point (– 3, 5) lies in the :
(a) First quadrant (b) Second quadrant
(c) Third quadrant (d) Fourth quadrant.

2. Abscissa of all the points on the y-axis is :
(a) 0 (b) 1
(c) 2 (d) any number.

3. Ordinate of all the points on the *x*-axis is :
(a) 0 (b) 1
(c) – 1 (d) any point.

4. Point (0, – 7) lies :
(a) on the *x*-axis (b) in second quadrant
(c) on the *y*-axis (d) in fourth quadrant.

5. Point (– 10, 0) is lies :
(a) negative side of *x*-axis (b) negative side of *y*-axis
(c) in third quadrant (d) in fourth quadrant.

6. The point at which both the co-ordinate axes meet is called :
(a) abscissa (b) ordinate
(c) origin (d) quadrant.

7. A point both of whose co-ordinates are negative will lie is :
(a) first quadrant (b) second quadrant
(c) third quadrant (d) fourth quadrant.

8. The abscissa of a points is positive in :
(a) I & II quadrants (b) I & IV quadrants
(c) I quadrant only (d) II quadrant only.

9. The points whose abscissa and co-ordinate have different signs will lie in :
(a) I & II quadrant (b) II & III quadrant
(c) I & III quadrant (d) II & IV quadrant.

10. The point whose ordinate is 4 and which lies on *y*-axis is :
(a) (4, 0) (b) (0, 4)
(c) (1, 4) (d) (4, 2).

11. The perpendicular distance of point *P* (3, 4) from the *y*-axis is :
(a) 3 (b) 4
(c) 5 (d) 7.

12. (– 4, – 4) is situated in which quadrant : **(2018)**
(a) first (b) second
(c) third (d) fourth.

13. Co-ordinates of origin are : **(2019)**
(a) (2, 0) (b) (0, 2)
(c) (2, 2) (d) (0, 0).

Ans. : **1.** (b), **2.** (a), **3.** (a), **4.** (c), **5.** (a), **6.** (c), **7.** (c), **8.** (b), **9.** (d), **10.** (b), **11.** (a), **12.** (c), **13.** (d).

• Fill in the Blanks

1. The perpendicular distance of a point from *x*-axis is called ..... co-ordinate or ..... of the point.
2. The perpendicular distance of a point from *y*-axis is called ..... co-ordinate or ..... of the point.
3. The point of intersection of both the co-ordinate axes is called ..... .
4. The ..... of each of the points lie on the line parallel to *x*-axis is equal.
5. The ..... of each of the points line on the lie parallel to *y*-axis is equal.
6. The quadrant of the point (– 1, – 4) is ..... .
7. Ordinate of point (7, – 6) is ..... . **(2019, 20, 23)**
8. The co-ordinates of origin are ..... . **(2020)**

Ans. : 1. *y*, ordinate, **2.** *x*, abscissa, **3.** origin, **4.** ordinate, **5.** abscissa, **6.** third quadrant, **7.** – 6, **8.** (0, 0).

• Match the Columns

Column 'A'		Column 'B'
1. Point (0, *b*) lies on		(a) *x*-co-ordinate
2. Point (*a*, 0) lies on		(b) 5
3. Co-ordinates of origin	**(2019)**	(c) *y*-axis
4. Domain (abscissa)		(d) *x*-axis
5. Distance of point (3, 5) from *X*-axis		(e) (0, 0)
6. The co-ordinates of *X*-axis	**(2023)**	(f) 3rd quadrant
7. (– 1, – 2)	**(2023)**	(g) (abscissa, 0)

Ans. : 1. → (c), **2.** → (d), **3.** → (e), **4.** → (a), **5.** → (b), **6.** → (g), **7.** → (f).

• True/False

1. Ordinate of the points lie on x-axis is always zero.
2. The distances above X-axis are always negative and those below x-axis are positi
3. Abscissa of the points lie on Y-axis is always zero.
4. The distances of the points right side the Y-axis are negative and those of left si the y-axis are positive.
5. The point of intersection of the axis is called origin. (202
6. The point $(-8, 0)$ lies on X-axis.
7. $x = 0$ is an equation of X-axis. (202
8. Point $(2, 2)$ lies in first quadrant.
9. Point $(0, 3)$ lies in third quadrant. (201
10. Co-ordinates of origin are $(0, 0)$. (201

Ans. : 1. True, **2.** False, **3.** True, **4.** False, **5.** True, **6.** True, **7.** False, **8.** Tru **9.** False, **10.** True.

• Answer in One Word/Sentence

1. In which quadrant the points $(8, -6)$ and $(-5, 2)$ lie.
2. What will be the ordinate of points which lie on x-axis.
3. What will be the abscissa of points where lie on y-axis.
4. Write the co-ordinates of point of origin. **(2020, 22)**
5. What is the name of point of intersection of the co-ordinate axes.
6. Point $(3, -2)$ in situated is which quadrant ? **(2020)**
7. What is quadrant ? **(2023)**

Ans. : 1. Fourth & second respectively, **2.** Zero, **3.** Zero, **4.** $(0, 0)$, **5.** Point of origin, **6.** Fourth, **7.** The co-ordinate axes divide the plane into four parts called quadrant.

(iv) Every point on the graph of a ... represent a solution of the linear equation.

(v) The graph of every linear equation in two variables need not be a ...

Ans. : (i) The statement is true because the co-ordinates of the point satisfy the ... equation.

(ii) The statement is false because the co-ordinates of the given point do ... satisfy the given equation.

(iii) The statement is true because the co-ordinates of the point $(3, -5)$ do ... satisfy the given equation.

(iv) The statement is false because the every point on the graph of a ... equation is a solution of that equation.

(v) The statement is false because the graph of a linear equation in two varia... is always a straight line.

Qus. 2. Write linear equation where ordinate is three times that of abscissa. (2...

Ans : $y = 3x$.

Qus. 3. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, find the v... of a. (2...

Sol. : Since point (3, 4) lies on the graph of equation $3y = ax + 7$

$$\Rightarrow \quad 3 \times 4 = a \times 3 + 7 = 12 = 3a + 7$$

$$\Rightarrow \quad 3a = 12 - 7 = 5 \Rightarrow a = \frac{5}{3}$$

Thus, **the required value of** $a = \frac{5}{3}$.

Objective Questions

• Multiple Choice Questions

1. The linear equation $2x - 5y = 7$ has :

(a) a unique solution (b) two solutions

(c) infinitely many solution (d) no solution.

2. If (2, 0) is the solution of the linear equation $2x + 3y = k$, then the value of k is

(a) 4 (b) 6 (c) 5 (d) 2.

3. The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at a point.

(a) (2, 0) (b) (0, 3) (c) (3, 0) (d) (0, 2).

4. Any point on the line $y = x$ is of the form :

(a) (a, a) (b) $(0, a)$ (c) $(a, 0)$ (d) $(a, -a)$.

5. Linear equation of two variables is : (20...

(a) $ax^2 + bx + c = 0$ (b) $ax + b = 0$

(c) $ax^3 + bx^2 + c = 0$ (d) $ax + by + c = 0$.

6. If $2x - 3 = 5$, then value of x is : (20...

(a) 2 (b) 3 (c) 4 (d) 5.

7. One solution of equation $x - 2y = 4$ is : (2020,...

(a) (0, 3) (b) (2, 2) (c) (4, 0) (d) (0, 4).

8. The point of the form $(a, -a)$ always lies on the line :

(a) $x = a$ (b) $y = -a$

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

9. The sum of two numbers is 25 and difference is 5, then the numbers are : (2018)

(a) 15, 10 (b) 20, 5 (c) 13, 12 (d) 30, 5.

10. If $3x = 24$, then the value of x will be : (2022)

(a) 6 (b) 8 (c) 12 (d) 1.

Ans. : 1. (c), **2.** (a), **3.** (d), **4.** (a), **5.** (d), **6.** (c), **7.** (c), **8.** (d), **9.** (a), **10.** (b).

• Fill in the Blanks

1. The equation whose graph is a straight line is called _____ equation.
2. The graph of a linear equation of type $ax + by + c = 0$ is a _____ line.
3. If $3x = 24$, then the value of x is ..... . (2020)
4. If a system of equations does not have any solution then it is called _____ system.
5. If a system of equation has a solution then it is called _____ system.
6. If in an equation $x + 2y = 5$, $x = 1$, then the value of y is _____ . (2019)

Ans. : 1. linear, **2.** straight, **3.** 8, **4.** consistent, **5.** inconsistent, **6.** 2 (two).

• Match the Columns

Column 'A'	Column 'B'
1. Value of y in $5y - 1 = y + 11$	(a) -1
2. Solution of $3x - 2 = 4$	(b) 3
3. Solution of $8x + 5 = 3x$	(c) 2

Ans. : 1. → (b), **2.** → (c), **3.** → (a).

• True/False

1. The value of y in equation $x + 2y = 5$, if $x = 1$ will be 2.
2. A solution of $x + y = 0$ is $x = 1$ and $y = -1$. (2020)
3. The equation of two variables having degree one is called linear equation.
4. One solution of equation $x + 2y = 3$ is (1, 1). (2019)
5. Point (0, 5) is a solution of equation $y = 5x + 5$. (2019)
6. The graph of a line passing through origin is represented by $y = kx$. (2019)
7. 2 and -3 are variables of linear equation $2x - 3y = 0$. (2019)
8. Equation $y = 3x + 5$ has infinitely many solutions. (2022)

Ans. : 1. True, **2.** True, **3.** True, **4.** True, **5.** True, **6.** True, **7.** False, **8.** True.

• Answer in One Word/Sentence

1. If $a_1/a_2 \neq b_1/b_2$ then what will be the type of solutions of that system.
2. If $a_1/a_2 = b_1/b_2 \neq c_1/c_2$ then what will be the type of solutions of that system.
3. If $a_1/a_2 = b_1/b_2 = c_1/c_2$, then what will be the type of solutions of that system.
4. Highest power of variable in linear equation is. (2018, 20)
5. Write a linear equation of two variables. (2019)
6. If $x = 2$, $y = 1$ is a solution of $2x + 3y = k$, the value of k will be? (2019)
7. Write the linear equation $x = 3y$ in standard form. (2023)

Ans. : 1. Unique solution, **2.** No solution, **3.** Infinite solutions, **4.** One, **5.** $ax + by + c = 0$, **6.** 7 (Seven), **7.** $x - 3y + 0 = 0$.

$\Rightarrow$ $AC + CB = DC + CE$ (Euclid's axiom-2)

but $AC + CB = AB$ and $DC + CE = DE$ (As shown in the given figure)

$\Rightarrow$ $AB = DE$. **Proved**

Very Short Answer Questions

Write whether the following statements are True or False ? Justify your answer.

Qus. 1. Euclidean geometry is valid only for curved surfaces.

Ans. : False Statement because it is valid only for the figures made up in a plane.

Qus. 2. The boundaries of solids are curved.

Ans. : False statement because the boundaries of the solids are surfaces.

Qus. 3. The edges of a surface are curved.

Ans. : False statement because edges of surface are lines.

Qus. 4. The things which are doubles of the same thing are equal to one another.

Ans. : True statement because this is according to Euclid's axiom-6.

Qus. 5. If the quantity *B* is a part of quantity *A*, then *A* can be written as the sum of *B* and some third quantity *C*.

Ans. : True statement according to Euclid's axiom.

Qus. 6. The statements that are proved are called axioms.

Ans. : False statement because the statements that are proveds are called theorems.

Qus. 7. Write Euclid's fifth postulate. **(2023)**

Ans. : Euclid's fifth postulate : "If a straight line falling on two straight lines makes the interior angles on the same sides of it taken together less then two right angles, then two straight lines, if produced indefinitely meet on that side on which the sum of angles is less than two right angles."

Objective Questions

• Multiple Choice Questions

1. In ancient India altars with combination of shapes like rectangles, triangles and trapeziums were used for :

(a) Public worship (b) Household rituals

(c) Both (a) and (b) (d) None of (a), (b) and (c).

2. In Ancient India the shapes of altars used for house hold rituals were :

(a) Squares and circles (b) Triangles and rectangles

(c) Trapeziums and pyramids (d) Rectangles and squares.

3. The number of inter women isosceles triangle in Sriyantra in the Atharva Veda is :

(a) Seven (b) Eight (c) Nine (d) Eleven.

4. Greek's Emphasised on :

(a) Inductive reasoning (b) Deductive reasoning

(c) Both (a) and (b) (d) Practical use of geometry.

5. Euclid belongs to the country :

(a) Babylonia (b) Egypt (c) Greece (d) India.

6. Thales belongs to the country :

(a) Babylonia (b) Egypt (c) Greece (d) Rome.

7. Pythagoras was a student of :

(a) Thales (b) Euclid (a) Both (a) and (b) (d) Archimedes.

8. Which of the following need proof ?

(a) Theorems (b) Axioms (c) Definition (d) Postulates.

9. Euclid stated that all right angles are equal to each other in the form of :

(a) an axiom (b) a definition (c) a postulate (d) a proof.

10. Lines are parallel if they do not intersect is stated in the form of :

(a) an axiom (b) a definition (c) a postulate (d) a proof.

Ans. : 1. (a), **2.** (a), **3.** (c), **4.** (b), **5.** (c), **6.** (c), **7.** (a), **8.** (a), **9.** (c), **10.** (b).

• Fill in the Blanks

1. The base of a pyramid is ..... .
2. The lateral surfaces of a pyramid are ..... .
3. The boundaries of solids are ..... .
4. The boundaries of surfaces are ..... .
5. The ratio of the diameters of the bricks used for construction work in Indus Valley Civilisation (about 3000 BC) were ..... .
6. ..... is greater than its part. **(2019)**

Ans. : 1. Any polygon, **2.** Triangular, **3.** Surfaces, **4.** Curves, **5.** 4 : 2 : 1, **6.** Whole.

• Match the Columns

Column 'A'	Column 'B'
1. Number of diameters of a solid	(a) 13
2. Number of diameters of a surface	(b) 465
3. Number of diameters of a point	(c) 3
4. Number of chapters in elements	(d) 2
5. Number of propositions in elements	(e) 0

Ans. : 1. $\rightarrow$ (c), **2.** $\rightarrow$ (d), **3.** $\rightarrow$ (e), **4.** $\rightarrow$ (a), **5.** $\rightarrow$ (b).

• True/False

1. Pyramid is a solid whose base is always a equilateral triangle.
2. In geometry we suppose the terms point, line and plane undefined terms.
3. Euclid's fourth axiom is "everything is equal to itself".
4. Euclid's geometry is valid only for the figures situated in the plane.
5. If equals are added to equals the totals are not equal.
6. The whole is greater than its part. **(2020)**

Ans. : 1. False, **2.** True, **3.** True, **4.** True, **5.** False, **6.** True.

• Answer in One Word/Sentence

1. How many straight lines can be drawn through a point ? **(2019)**
2. How many straight lines can be drawn through two distinct points ? **(2020)**
3. "Total is greater than its part" is which axiom ?
4. "All the right angles are equal to each other" is which postulate ?
5. What is the relation between two things which are equal to same thing ? **(2019)**
6. Write one postulate of Euclid ?

Ans. : 1. Infinitely many, **2.** One, **3.** Fifth axiom, **4.** Fourth postulate, **5.** They are equal, **6.** A straight line may be drawn from any one point to any other point.

2. The angles of a triangle are in the ratio 5 : 3 : 7, the triangle is :
(a) an acute angled triangle (b) an obtused angled triangle
(c) a right triangle (d) an isosceles triangle.

3. If one of the angle of a triangle 130°, then the angle between the bisectors of the other two angles can be :
(a) 50° (b) 65° (c) 145° (d) 155°.

4. In the given figure 6.46 *POQ* is a line. The value of x is :
(a) 20° (b) 25°
(c) 30° (d) 35°.

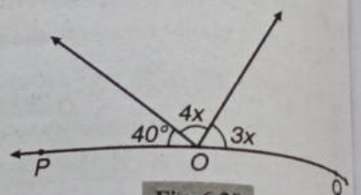

Fig. 6.30

5. The angles of a triangle are in the ratio 2 : 4 : 3. the smallest angle of the triangle is :
(a) 60° (b) 40°
(c) 80° (d) 20°.

Ans. : 1. (d), 2. (a), 3. (d), 4. (a), 5. (b).

• Fill in the Blanks

1. The part of a straight line which has two end points is called ..... .
2. If three or more than three points are in a straight line then the point are called ..... .
3. The part of a straight line which has one end point is called ..... .
4. When two rays originate from the same end point they form an ..... .
5. Both the rays forming an angle are called ..... .
6. If the sum of two adjacent angles is equal to ..... , then they form linear pair. (2019)

Ans. : 1. line segment, 2. collinear points, 3. ray, 4. angle, 5. arms of the angle, 6. 180°.

• Match the Columns

Column 'A'		Column 'B'
1. The angle of measure less than 90°		(a) 180°
2. The angle of measure equal to 90°		(b) Reflex angle
3. The angle of measure greater than 90° but less than 180°		(c) Acute angle
4. Straight angle	(2019)	(d) Right angle
5. The angle of measure greater than 180° but less than 360°		(e) Obtuse angle
6. A terminated line	(2018)	(f) Parallel
7. Two lines drawn parallel to one line are	(2018)	(g) Can be produced in definitely on both side

Ans. : 1. → (c), 2. → (d), 3. → (e), 4. → (a), 5. → (b), 6. → (g), 7. → (f).

• True/False

1. The sum of complementary angles is 180°.
2. In a triangle there are at least two acute angles.
3. The sum of supplementary angles is 90°.
4. There can't be two right angle in a triangle.

5. When a transversal line intersects two non-parallel lines then the alternate angles are equal.
6. All right angles are not equal to one another.

Ans. : 1. False, 2. True, 3. False, 4. True, 5. False, 6. False. (2023)

• Answer in One Word/Sentence

1. What is relation between the vertically opposite angles if two lines intersect each other ?
2. What is the measurement of a right angle ? (2022)
3. What are complementary angles ? (2022)
4. What is the range of measurement of an obtuse angle ? (2023)

Ans. : 1. Equal, 2. 90°, 3. If the sum of two angles is 90°, then each angle is said compliment angle to the other, 4. 90° < obtuse angle < 180°.

6. It is given that $\Delta ABC \cong \Delta FDE$ and $AB = 5$ cm, $\angle B = 40°$ and $\angle A = 80°$, which of the following is true ?
(a) $DF = 5$ cm, $\angle F = 60°$ (b) $DF = 5$ cm, $\angle E = 60°$
(c) $DE = 5$ cm, $\angle F = 60°$ (d) $DE = 5$ cm, $\angle D = 40°$.

7. In triangles ABC and PQR, $AB = AC$, $\angle C = \angle P$, $\angle B = \angle Q$, then two triangles are :
(a) Isosceles but not congruent (b) Isosceles and congruent
(c) Congruent but not isosceles (d) Neither congruent nor isosceles.

8. In ΔABC and DEF, $AB = FD$, $\angle A = \angle D$, then two triangles will be congruent by SAS axiom if :
(a) $BC = EF$ (b) $AC = DE$ (c) $AC = EF$ (d) $BC = DE$

9. Figures having same shape and same size :
(a) equal (b) same (c) congruent (d) similar.

10. In right angled triangle the longest side is :
(a) altitude (b) base (c) hypotenuse (d) line.

11. The value of each angle in equilateral triangle is :
(a) 90° (b) 30° (c) 60° (d) 120°.

12. Pythagoras Theorem is proved for triangle :
(a) equilateral triangle (b) congruent triangle
(c) isosceles triangle (d) right angled triangle.

13. In any right angled triangle one angle is 45°, then other acute angle will be :
(a) 60° (b) 45° (c) 90° (d) 30°.

Ans. : 1. (c), 2. (b), 3. (b), 4. (c), 5. (a), 6. (b), 7. (a), 8. (
9. (c), 10. (c), 11. (c), 12. (d), 13. (b).

● Fill in the Blanks

1. The measurement of each angle of equilateral triangle is ..... .
2. The longest side of right angled triangle is ..... .
3. The sum of all three interior angles of a triangle is ..... .
4. The figures of same shape and same size are ..... .
5. The angle opposite to equal sides of a triangle are ..... .
6. The median of a triangle divides it into ..... triangles of equal area. (20

Ans. : 1. 60°, 2. hypotenuse, 3. 180°, 4. congruent, 5. equal, 6. two.

● Match the Columns

Column 'A'	Column 'B'
1. A triangle of equal sides	(a) Obtuse angle triangle
2. A triangle of two equal sides	(b) Acute angle triangle
3. A triangle in which an angle is 90°	(c) Equilateral triangle
4. A triangle in which an angle is obtuse	(d) Angle
5. A triangle in which each angle is acute	(e) Right angled Triangle

6. The point of intersection of all medians in any triangle is called (f) Right angled Triangle (2018)
7. Common end point (2023) (g) Centroid

Ans. : 1. → (c), 2. → (f), 3. → (e), 4. → (a), 5. → (b), 6. → (g), 7. → (d).

● True/False

1. All the three angles of an isosceles triangle are equal. (2018)
2. All the circles are congruent.
3. If in two triangles, corresponding sides are equal then triangles are congruent. (2019)
4. Sum of three angles of a triangle is 180°. (2019, 23)
5. In congruent triangles corresponding parts are equal. (2019)
6. Each angle of an equilateral triangle is 90°. (2023)

Ans. : 1. False, 2. False, 3. True, 4. True, 5. True, 6. False.

● Answer in One Word/Sentence

1. What is the maximum number of right angles that can be in a triangle ?
2. What is the maximum number of obtuse angles that can be in a triangle.
3. What is the minimum number of acute angles that can be in a triangls.
4. What is relation between exterior angle of a triangle to its interior angle.
5. What will be the measure of each acute angle in right angled isosceles triangle ?
6. Write the formula for finding the perimeter of scalene triangle. (2022)
7. What is an equilateral triangle ? (2022)
8. Define the congruent triangles. (2023)

Ans. : 1. One, 2. One, 3. Two, 4. The exterior angle of a triangle is equal to the same of two opposite interior angles, 5. 45°, 6. Perimeter = $a + b + c$, where a, b and c are the measure of sides of the triangle, 7. The triangle having all the three sides equal is called equilateral triangle, 8. The two triangles are called congruent if they are the same shape and of the same size.

Ans. : ...lateral is a parallelogram $\Rightarrow CD = AB = 4$ cm.

Objective Questions

• Multiple Choice Questions

1. **If the opposite sides of a quadrilateral are equal then it will be :**
   (a) trapezium (b) cyclic quadrilateral
   (c) parallelogram (d) rectangle.
2. **In a parallelogram $ABCD$ equal angles will be :** (2023)
   (a) $\angle A$ and $\angle B$ (b) $\angle B$ and $\angle C$ (c) $\angle A$ and $\angle C$ (d) $\angle C$ and $\angle D$.
3. **If the diagonals of a quadrilateral equal and mutually perpendicular, then it is :**
   (a) rectangle (b) parallelogram
   (c) square (d) rhombus.
4. **In which of the following figure the diagonals do not bisect each other :**
   (a) rectangle (b) parallelogram
   (c) trapezium (d) rhombus.
5. **The diagonals of a rhombus bisect each other at :**
   (a) right angle (b) acute angle
   (c) obtuse angle (d) none of these.
6. **Two angles of quadrilateral, if they donot take a common arm are :**
   (a) opposite angles (b) adjacent angles
   (c) right angles (d) acute angles.

Ans. : 1. (c), **2.** (c), **3.** (c), **4.** (c), **5.** (a), **6.** (a).

• Fill in the Blanks

1. Both the diagonals of a parallelogram ..... each other.
2. The diagonals of a rectangle are equal ..... each other.
3. The quadrilateral formed by joining the mid-points of the sides of a square is ..... .
4. If the diagonals of a quadrilateral are equal and perpendicular to each other then it is ..... .
5. The quadrilateral in which diagonals bisect each is at right angle is ..... . (2023)
6. Each angle of a rectangle is ..... .

Ans. : 1. bisect, **2.** bisect, **3.** square, **4.** square, **5.** rhombus, **6.** 90.

• Match the Columns

Column 'A'	Column 'B'
1. A quadrilateral of equal sides	(a) parallelogram
2. A rhombus having each angle a right angle	(b) trapezium
3. A parallelogram having each angle right angle	(c) rhombus
4. A quadrilateral having opposite sides equal **(2018)**	(d) square
5. The quadrilateral in which a pair of opposite sides is parallel	(e) rectangle
6. Angle between diagonals of a rhombus (in degree) **(2019)**	(f) 90°

Ans. : 1. → (c), **2.** → (d), **3.** → (e), **4.** → (a), **5.** → (b), **6.** → (f).

• True/False

1. The opposite angles of a parallelogram are equal.
2. The opposite sides of a trapezium are parallel.
3. The diagonals of a square are equal and bisect each other at right angle.
4. If the diagonals of a parallelogram are equal and perpendicular to each other then is rectangle.

Ans. : 1. True;, **2.** False;, **3.** True;, **4.** False.

• Answer in One Word/Sentence

1. What is figure formed by four sides called ?
2. What is relation between the segment joining the mid-points of two sides of triangle and the third side ?
3. In which ratio the line drawn through the mid-point of one side of a triangle parallel to another side intersects the third side ?
4. How many vertices are there in a quadrilateral ?
5. In a rectangle, what is the measure of each angle ?

Ans. : 1. Quadrilateral, **2.** Parallel to half of the third side, **3.** 1 : 1, **4.** Four, **5.** 90°

Very Short Answer Questions

Write True/False and justify your answer in each of the following :

Qus. 1. Two chords AB and CD of a circle are each at a distances 4 cm from the centre then $AB = CD$.

Ans. : True statement, because equidistant chords are equal.

Qus. 2. Two chords AB and AC of a circle with centre O are on the opposite sides of OA then $\angle AOB = \angle AOC$.

Ans. : False statement, because the angles are equal when sides $AB = AC$.

Qus. 3. Two congruent circles with centres O and O' intersect at two points A and B then $\angle AOB = \angle AO'B$.

Ans. : True statement in congruent circles equal chords subtend equal angles at their centres.

Qus. 4. Through three collinear points a circle can be drawn.

Ans. : False statement, because through three points a circle can be drawn when they are non-collinear.

Qus. 5. A circle of radius 3 cm can be drawn through two points A, B such that $AB = 6$ cm.

Ans. : True statement, because in this case AB is a diameter of the circle.

Qus. 6. If AOB is a diameter of a circle and C is a point on the circle the $AC^2 + BC^2 = AB^2$.

Ans. : True statement, because ΔACB is a triangle right angled at C. (Pythagoras theorem)

Qus. 7. $ABCD$ is a cyclic quadrilateral such that $\angle A = 90°$, $\angle B = 70°$, $\angle C = 95°$ and $\angle D = 105°$.

Ans. : False statement, because $\angle B + \angle D = 70° + 105° = 175° \neq 180°$ and $\angle A + \angle C = 90° + 95° = 185° \neq 180°$.

Qus. 8. If A, B, C and D are four points such that $\angle BAC = 30°$, $\angle BDC = 60°$ then D is the centre of the circle through A, B and C.

Ans. : False statement, because there can be may such point D at which $\angle BDC = 60°$ and each such point can not be the centre of the circle.

Qus. 9. If A, B, C and D are four points such that $\angle BAC = 45°$ and $\angle BDC = 45°$, then A, B, C, D are concyclic.

Ans. : True statement, because angles in the same segment are equal.

Objective Questions

• Multiple Choice Questions

1. AD is a diameter of a circle and AB is a chord. If $AD = 34$ cm, $AB = 30$ cm, the distance of AB from the centre of the circle is :
(a) 17 cm (b) 15 cm (c) 4 cm (d) 8 cm.

2. If $AB = 12$ cm, $BC = 16$ cm and AB is a perpendicular to BC then the radius of the circle passing through the points A, B and C is :
(a) 6 cm (b) 8 cm (c) 10 cm (d) 12 cm.

3. $ABCD$ is a cyclic quadrilateral such that AB is a distance of the circle circumscribing it and $\angle ADC = 140°$ then $\angle BAC$ is equal to :
(a) 80° (b) 50° (c) 40° (d) 30°.

4. Angle of semi-circle is :
(a) 180° (b) 90° (c) 45° (d) 270°.

5. The length of a chord which is at a distance of 3 cm from the centre of the circle of radius 5 cm will be :
(a) 4 cm (b) 10 cm (c) 6 cm (d) 8 cm.

6. The sum of pairs of opposite angles of a circle is :
(a) 360° (b) 90° (c) 180° (d) 60°.

Ans. : 1. (d), **2.** (c), **3.** (b), **4.** (b), **5.** (d), **6.** (c).

• Fill in the Blanks

1. The longest chord of the circle is called ..... .
2. The angles of same segment of a circle are ..... . (2023)
3. Angle of semi-circle is ..... .
4. The line segment join any two points of a circle is called ..... of the circle. (2019)
5. The perpendicular drawn from the centre of a circle to its chord ..... the chord.
6. If radii of two circles are equal then they will be .....
7. The sum of pairs of opposite angles of a cyclic quadrilateral is ..... .
8. Two circles are always ..... .
9. The centre of a circle lies in ..... of the circle. (2019) (2022)

Ans. : 1. diameter, **2.** equal, **3.** right angle, **4.** chord, **5.** bisect, **6.** congruent, **7.** 180°, **8.** similar, **9.** interior.

• Match the Columns

Column 'A'	Column 'B'
1. Angle of semi-circle is	(a) diameter
2. Sum of pairs of opposite angles of a cyclic quadrilateral	(b) passes through the centre of the circle
3. Cyclic rhombus is	(c) 90° (right angle)
4. The langest chord of a circle	(d) equal
5. The perpendicular bisector of a chord	(e) a square
6. The radii of two equal circles (2018)	(f) 180°

Ans. : 1. → (c), **2.** → (f), **3.** → (e), **4.** → (a), **5.** → (b), **6.** → (d).

• True/False

1. Angle subtended in major segment of a circle is acute angle.
2. Equal chords of a circle subtend equal angles at the centre of the circle.
3. The longest chord of a circle is the diameter of the circle. (2022)
4. The angle subtended in semi-circle is right angle. (2023)
5. If the radii of two circles are equal then the circles are congruent.

Ans. : 1. True, **2.** True, **3.** True, **4.** True, **5.** True.

• Answer in One Word/Sentence

1. What is the type of angle subtended in a semi-circle ?
2. What is the type of angle subtended in major sector ?
3. What is the type of angle subtended in minor sectors ?
4. What is the cyclic parallelogram called ?
5. What is cyclic rhombus called ?
6. Write the name of longest chord of a circle. (2019)

Ans. : 1. Right angle, **2.** Acute angle, **3.** Obtuse angle, **4.** Rectangle, **5.** Square, **6.** Diameter.

Very Short Answer Questions

Write True or False and justify your answer.

Qus. 1. The area of a triangle with base 4 cm and height 6 cm is 24 cm².

Ans. : False statement, because *ar* (Triangle) $= \frac{1}{2} \times 4 \times 6 = 12$ cm².

Qus. 2. The area of ΔABC is 8 cm² in which $AB = AC = 4$ cm and $\angle A = 90°$.

Ans. : True statement, because *ar* $(ABC) = \frac{1}{2} \times 4 \times 4 = 8$ cm².

Qus. 3. The area of an isosceles triangle is $\frac{5}{4}\sqrt{11}$ cm², if the perimeter is 11 cm and the base is 5 cm.

Ans. : True statement, because each equal side is 3 cm.

Qus. 4. The area of the equilateral triangle $20\sqrt{3}$ cm² which each side is 8 cm.

Ans. : False statement, because the area of the given equilateral triangle is $16\sqrt{3}$ cm².

Qus. 5. If the side of a rhombus is the 10 cm and one diagonal is 16 cm, then area of the rhombus is 96 cm².

Ans. : True statement, because the other diagonal is 12 cm. Therefore

$$\text{area} = \frac{1}{2} \times 16 \times 12 = 96 \text{ cm}^2.$$

Qus. 6. The base and the corresponding altitude of a parallelogram are 10 cm and 3·5 cm respectively. The area of the parallelogram is 30 cm².

Ans. : False statement, because *ar* (parallelogram) $= 10 \times 3{\cdot}5 = 35$ cm².

Qus. 7. The area of a regular hexagon of side *a* is the sum of the areas of the five equilateral triangles with side *a*.

Ans. : False statement, because the area of the hexagon is equal to the sum of six equilateral triangles with side *a*.

Objective Questions

• Multiple Choice Questions

1. An isosceles right triangle has area 8 cm². The length of its hypotenuse is :

(a) $\sqrt{32}$ cm (b) $\sqrt{16}$ cm (c) $\sqrt{48}$ cm (d) $\sqrt{24}$ cm.

2. The perimeter of an equilateral triangle is 60 m. The area is :

(a) $10\sqrt{3}$ m² (b) $15\sqrt{3}$ m² (c) $20\sqrt{3}$ m² (d) $100\sqrt{3}$ m².

3. The area of an equilateral triangle with side $2\sqrt{3}$ cm is :

(a) 5·196 cm² (b) 0·866 cm² (c) 3·496 cm² (d) 1·392 cm².

4. The length of each side of an equilateral triangle having an area of $9\sqrt{3}$ cm² is:

(a) 8 cm (b) 36 cm (c) 4 cm (d) 6 cm.

5. If the area of an equilateral triangle is $16\sqrt{3}$ cm² then the perimeter of the triangle is :

(a) 48 cm (b) 24 cm (c) 12 cm (d) 36 cm.

Ans. : 1. (a), **2.** (d), **3.** (a), **4.** (d), **5.** (b).

• Fill in the Blanks

1. The equal sides of an isosceles right triangle is 10 cm each then the length of its diagonals is ..... .
2. The area of a rectangle with sides 10 cm and 6 cm will be ..... .
3. The area of an equilateral triangle with side 10 cm is ..... .
4. The unit of area of a rectangle whose sides are measured in metre is ..... .
5. The area of a triangle of base 12 cm and its altitude 8 cm is ..... .

Ans. : 1. $10\sqrt{2}$ cm, **2.** 60 cm², **3.** $25\sqrt{3}$ cm², **4.** m², **5.** 48 cm².

• Match the Columns

Column 'A'	Column 'B'
1. Area of a rhombus with diagonals 'd_1' and 'd_2'	(a) $\frac{1}{2} \times a \times d$
2. Area of an equilateral triangle with side 'a'	(b) $\frac{1}{2} d^2$
3. Heron's formula	(c) $\frac{1}{2} \times d_1 \times d_2$
4. Area of a triangle with base a and altitude 'd'	(d) $\frac{a^2}{4}\sqrt{3}$
5. Area of a square with diagonal 'd'	(e) $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{a+b+c}{2}$

Ans. : 1. → (c), **2.** → (d), **3.** → (e), **4.** → (a), **5.** → (b).

• True/False

1. Heron's formula is used only to determine the area of parallelogram.
2. The area of a triangle is equal to its base × its altitude.
3. The area of a rectangle is equal to the product of its length and breadth.
4. The area of a rhombus is equal to the product of its diagonals.

Ans. : 1. False, **2.** False, **3.** True, **4.** False.

• Answer in One Word/Sentence

1. Write the unit of the perimeter of a triangle.
2. Write the unit of measurement of an area.
3. What the sum of all sides of a triangle is called ?
4. The side of a square is 4 cm. The diagonals of the square divide the square in four congruent triangles. What is the area of each triangle ?
5. Where the Heron was born ?
6. Write Heron's formula to find the area of a triangle. **(2023)**

Ans. : 1. cm or m, **2.** cm² or m², **3.** Perimeter, **4.** 4 cm², **5.** Alexandria in Egypt,

6. $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{a+b+c}{2}$.

Very Short Answer Questions

Write True or False and justify your answer in each of the following :

Qus. 1. The volume of a sphere is equal to two third of the volume of a cylinder whose height and diameter are equal to the diameter of the sphere.

Ans. : True statement, because, the volume of the sphere $= \frac{4}{3}\pi R^3$ and that of cylinder $= 2\pi R^3$.

Qus. 2. If the radius of a right circular cone is halved and height is doubled the volume will remain unchanged.

Ans. : False statement, because the new volume is half of the old volume.

Qus. 3. In a right circular cone, height, radius and slant height do not always be the sides of right triangle.

Ans. : False statement, because $l^2 = r^2 + h^2$ by Pythagoras theorem always true.

Qus. 4. The volume of the largest right circular cone that can be fitted in a cube whose edge is $2r$ equals to the volume of a hemisphere of radius r.

Ans. : True statement, because the volume of the cone $= \frac{1}{3}\pi r^2 (2r)$

$\therefore$ Volume of the cone $= \frac{2}{3}\pi r^3$

= the volume of the hemisphere of radius r.

Objective Questions

• Multiple Choice Questions

1. The volume of sphere is : **(2020)**

(a) $\frac{2}{3}\pi r^3$ (b) $4\pi r^3$ (c) $\frac{4}{3}\pi r^3$ (d) $2\pi r^2$.

2. A cone is 8.4 cm high and the radius of its base is 2·1 cm. It is melted and recast into a sphere. The radius of the sphere is :

(a) 4·2 cm (b) 2·1 cm (c) 2·4 cm (d) 1·6 cm.

3. The total surface area of a cone whose radius is $r/2$ and slant height $2l$ is :

(a) $2\pi r (l + r)$ (b) $\pi r (l + r/4)$ (c) $\pi r (l + r)$ (d) $2\pi rl$.

4. The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratio of the surface area of the balloon in the two cases is :

(a) 1 : 4 (b) 1 : 3 (c) 2 : 3 (d) 2 : 1.

5. The formula of volume of a cone is :

(a) $\pi r^2 h$ (b) $\frac{4}{3}\pi r^2 h$ (c) $\frac{1}{3}\pi r^2 h$ (d) $4a^2 h$.

6. The slant height of a cone is 13 cm and the radius of the base is 5 cm then its height is :

(a) 5 cm (b) 22 cm (c) 12 cm (d) 18 cm.

7. Volume of hemisphere is : **(2019)**

(a) $\frac{4}{3}\pi r^3$ (b) $\frac{2}{3}\pi r^3$ (c) $2\pi r^3$ (d) $4\pi r^3$.

Ans. : 1. (c), **2.** (b), **3.** (b), **4.** (a), **5.** (c), **6.** (c), **7.** (b).

• Fill in the Blanks

1. The volume of cone is .....
2. Volume of sphere is .....
3. Total surface area of hemisphere is ..... **(2020)**

Ans. : 1. $\frac{1}{3}\pi r^2 h$, **2.** $\frac{4}{3}\pi r^3$, **3.** $3\pi r^2$.

• Match the Columns

Column 'A'	Column 'B'
1. Volume of a hemisphere	(a) πr^2
2. Lateral height of a cone	(b) $\pi r (l + r)$
3. Surface area of sphere	(c) $\frac{2}{3}\pi r^3$
4. Base area of the cone	(d) $\sqrt{h^2 + r^2}$
5. Total surface area of the cone	(e) $4\pi r^2$

Ans. : 1. → (c), **2.** → (d), **3.** → (e), **4.** → (a), **5.** → (b).

• True/False

1. The area of a curved surface of a cone $= \pi rl$.
2. Surface area of a sphere $= 4/3\ \pi r^2$.
3. Volume of hemisphere $= \frac{2}{3}\pi r^3$.
4. The volume of a cone $= \frac{1}{3}\pi r^2 h$. **(2023)**

Ans. : 1. True, **2.** False, **3.** True, **4.** True.

• Answer in One Word/Sentence

1. When a semi-circle is revolved about its diameter then what is the name of the solid so formed ?
2. Write surface area of sphere. **(2019)**
3. Write Lateral (curved) surface area of a hemisphere. **(2023)**

Ans. : 1. Sphere, **2.** $4\pi r^2$, **3.** $2\pi r^2$.