MATHEMATICS

Questions: 40   **Marks: 160**

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    i)   Irrational Numbers   (2)
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ALGEBRA
IRRATIONAL NUMBERS

1. Natural Number

Numbers starting from 1 and which goes to infinity are said to be natural numbers

e.g. 1, 2, 3, ...

2. Whole Number

If we include zero to Natural Numbers then numbers are said to be whole numbers. These number are 0, 1, 2, 3, 4, ...

3. Integers

The numbers which include zero, natural numbers and negative natural numbers are called Integers e.g. – 4, – 3, – 2, – 1, 0, 1, 2, 3, 4, ...

4. Rational Numbers :–

Numbers which can be expressed in the form $\frac{p}{q}$ where p $\in$ I ; q $\in$ I and q $\neq$ 0 also p & q are co-prime i.e. H.C.F of p & q is 1.

e.g. $\frac{3}{7}, \frac{-1}{8}, \frac{2}{9}$ ....etc.

The set of rational numbers are denoted by Q.

$$\therefore \quad Q = \left\{ \frac{p}{q} ; p \in I, q \in I, q \neq 0 \right\}$$

Every rational number, like all the fraction, can also be expressed in decimal form and can be represented either in the form of terminating decimal or non-terminating decimal.

5. Conversion of decimal number in rational number of the form $\frac{p}{q}$.

Case (I) When the decimal is of terminating nature.

Steps (1) Convert the given decimal in to rational number.

(2) Find position of decimal in the given number.

(3) To remove decimal in numerator, write 1 in the denominator followed by number of zero as many digits after decimal in numerator.

(4) Now on dividing numirator and denominator by common divisor we get rational expression in the form $\frac{p}{q}$.

Case (II) When decimal representation is non-terminating repeating nature.

1. Pure recurring decimal

A decimal in which all the digits after decimal point are repeated.

Steps : (1) Let the given fraction equal to some constant number.

(2) Remove bar over the given fraction and write repeated number twice.

(3) Find number of repeated digits and multiply both side by 10^n. where n is number of repeated digit.

(4) Subtract step 2 from step 3.

(5) Now, dividing number obtained by coefficient and express fraction into lowest term.

2. Mixed recurring decimals

Steps : (1) Change the mixed recurring decimal into Pure recurring decimal by multiply 10^n, where n is the number of non-repeating digits after decimal.

(2) Solve the decimal by using pure recurring steps.

6. Irrational Numbers

A number is an irrational number, if it has non-terminating and non-repeating decimal

representation.

OR

The numbers which are not rational are called irrational number. e.g. $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, π.... etc.

7. Real Numbers

The set of all rational and irrational numbers is called real numbers.

8. Surds (ÕÖä Æ½)

Let 'a' be a real number and 'n' be a positives integer such that the nth root of a i.e.,

$a^{1/n}$ or $\sqrt[n]{a}$ is an irrational number then $a^{1/n}$ is called a surds or radical of order n and a is called radicand.

(i) Every surd is an irrational number but every irrational number is nor surd.

(ii) A surd which has unity only as rational factor is called a pure surd.

(iii) A surd which has a rational factor other than unity is mixed surd.

SET-I

1. Numbers which can be expressed in the form

of $\dfrac{p}{q}$ where p and q are integers and q $\neq$ 0

are called.
(a) Natural Numbers
(b) Integers
(c) Rational Numbers
(d) Irrational Numbers.

2. The rational number $\dfrac{7}{6}$ in the decimal form is

(a) $1 \cdot 1\bar{6}$
(b) $1 \cdot \overline{16}$
(c) $1 \cdot 16$
(d) None of these.

3. The rational number $\dfrac{-22}{13}$ in the decimal form is

(a) $-1 \cdot \overline{6927}$
(b) $-1 \cdot \overline{692307}$
(c) $-1 \cdot \overline{69237}$
(d) None of these.

4. $1 \cdot 001$ can be written as

(a) $\dfrac{1001}{1000}$
(b) $\dfrac{11}{10}$
(c) both (a) and (b)
(d) None of these.

5. $\dfrac{p}{q}$ form of $2 \cdot 15$ is

(a) $\dfrac{217}{100}$
(b) $\dfrac{43}{20}$
(c) $\dfrac{215}{10}$
(d) None of these.

6. $\dfrac{p}{q}$ form of $4 . \bar{7}$ is

(a) $\dfrac{47}{10}$
(b) $\dfrac{43}{9}$
(c) $\dfrac{43}{99}$
(d) None of these.

7. Which of the following is a rational number?

(a) $\left(\sqrt{2} - 1\right)^2$
(b) $\left(1 + \sqrt{2}\right)\left(1 - \sqrt{2}\right)$
(c) $\left(\sqrt{2} + 1\right)^2$
(d) None of these.

8. Product of a rational and an irrational number is
(a) rational number
(b) natural number
(c) irrational number
(d) None of these.

9. Every real number is either .... or .... number
(a) rational or irrational
(b) irrational or rational
(c) both (a) and (b)
(d) None of these.

10. $\sqrt[m]{\sqrt[n]{a}}$ can be written as

(a) $\sqrt[mn]{a}$
(b) $\sqrt[n]{\sqrt[m]{a}}$
(c) both
(d) None of these.

11 $(\sqrt[n]{a})^m$ can be represent as

   a) $\sqrt[n]{a^m}$ b) $\sqrt[m]{a^n}$

   c) $(\sqrt[m]{a})^n$ d) None of these

12. The value of $\sqrt{49} \times \sqrt{27}$

   (a) $3\sqrt{21}$ (b) $21\sqrt{3}$

   (c) $9\sqrt{21}$ (d) $21\sqrt{9}$

13. The value of $\sqrt[3]{2}.\sqrt[4]{2}.\sqrt[12]{32}$ is

   (a) $\sqrt[5]{4}$ (b) $\sqrt[5]{6}$

   (c) $\sqrt[5]{24}$ (d) None of these.

14. The value of $\dfrac{1}{4+\sqrt{5}}$ is

   (a) $\dfrac{4-\sqrt{5}}{11}$ (b) 0

   (c) 1   (d) $\dfrac{4+\sqrt{5}}{11}$

15. The value of $\dfrac{8}{2-\sqrt{5}}$ is

   (a) $-(16+8\sqrt{5})$ (b) $16+8\sqrt{5}$

   (c) $6-8\sqrt{5}$ (d) None of these.

16. The value of $\dfrac{3}{3-\sqrt{2}}+\dfrac{2}{3+\sqrt{2}}$

   (a) $\dfrac{15-\sqrt{2}}{7}$ (b) $\dfrac{15+\sqrt{2}}{7}$

   (c) $\dfrac{15-\sqrt{2}}{7}$ (d) $\dfrac{15+\sqrt{2}}{6}$.

17. The value of $\dfrac{\sqrt{7}}{2\sqrt{2}}$ is

   (a) $\dfrac{\sqrt{14}}{4}$ (b) $\dfrac{2\sqrt{7}}{2}$

   (c) $\dfrac{7\sqrt{2}}{2}$ (d) None of these.

18. If $\dfrac{3+\sqrt{7}}{2-\sqrt{7}}=a+b\sqrt{7}$, then the value of 'a' and 'b' are

   (a) 8, 3

   (b) 3, 8

   (c) both

   (d) None of these.

19. Find the value of $\sqrt[4]{3} \div \sqrt[3]{4}$

   (a) $\sqrt[12]{\dfrac{9}{256}}$ (b) $\sqrt[12]{\dfrac{256}{9}}$

   (c) $\sqrt[12]{256}$ (d) None of these.

20. Find the value of $\dfrac{4+\sqrt{7}}{6-\sqrt{7}}$ is

   (a) $\sqrt{18}$

   (b) $\dfrac{31-\sqrt{6}}{18}$

   (c) $\dfrac{31+10\sqrt{7}}{29}$

   (d) None of these.

21. Find the value of $\sqrt[2]{25} \div \sqrt[2]{49}$

   (a) $\dfrac{2}{5}$ (b) $\dfrac{7}{5}$

   (c) $\dfrac{5}{7}$ (d) $\dfrac{5}{2}$

SET-II

1. The numbers which include zero and natural numbers and negative nautral numbers are called.
   (a) Real numbers
   (b) Rational numbers
   (c) Integers
   (d) None of these.

2. The set of rational and irrational numbers are called
   (a) Real numbers (b) Natural numbers
   (c) Integers   (d) None of these.

3. The value of $\dfrac{29}{1000}$ in the decimal form is
   (a) 0·29   (b) 0·0029
   (c) 0.029   (d) 2.9

4. The value of $\dfrac{16}{45}$ is the decimal form is
   (a) $0·3\bar{5}$ (b) 0·356
   (c) $0·\overline{35}$ (d) None of these.

5. $-2\dfrac{1}{7}$ in the decimal form is :
   (a) $-2·\overline{142857}$ (b) $-2·\overline{1432}$
   (c) $-2·\overline{14857}$ (d) None of these.

6. $\dfrac{p}{q}$ form of $0·\overline{37}$ is
   (a) $\dfrac{37}{100}$ (b) $\dfrac{37}{99}$
   (c) $\dfrac{378}{1000}$ (d) None of these.

7. $\dfrac{p}{q}$ form of $0.\bar{1}$ is :
   (a) $\dfrac{1}{100}$ (b) $\dfrac{1}{9}$
   (c) $\dfrac{9}{100}$ (d) None of these.

8. $125·\bar{3}$ can be written as :
   (a) $\dfrac{376}{3}$ (b) $\dfrac{356}{3}$
   (c) $\dfrac{366}{3}$ (d) $\dfrac{386}{3}$

9. $0.\overline{585}$ can be written as :
   (a) $\dfrac{585}{100}$ (b) $\dfrac{585}{999}$
   (c) $\dfrac{100}{585}$ (d) $\dfrac{999}{585}$

10. Two rational numbers between 5 and 6 are
    (a) 4·50, 4·25   (b) 6·25, 6·50
    (c) 5·25, 5·50   (d) 7·25, 7·50

11. $\sqrt{2}$ is a :
    (a) rational   (b) irrational
    (c) both (a) & (b)   (d) None of these.

12. The sum of rational numbers and Irrational number is a
    (a) rational   (b) irrational
    (c) both (a) & (b)   (d) None of these.

13. Two irrational numbers between $\sqrt{2}$ & $\sqrt{7}$.
    (a) $\sqrt{3}, \sqrt{6}$ (b) $\sqrt{3}, \sqrt{5}$
    (c) $\sqrt{5}, \sqrt{6}$ (d) All of above.

14. 0 is a/an .... number.
    (a) rational   (b) irrational
    (c) natural   (d) None of these.

15. The value of $\sqrt[3]{7} \times \sqrt[3]{49}$ is
    (a) 7   (b) $\sqrt{7}$
    (c) 49   (d) None of these.

16. The value of $4\sqrt{12} \times 7\sqrt{6}$ is
    (a) 168   (b) $168\sqrt{2}$
    (c) $168\sqrt{3}$ (d) None of these.

17. The value of $\dfrac{3}{5-\sqrt{3}} + \dfrac{2}{5+\sqrt{3}}$ is

    (a) $\dfrac{22}{25+\sqrt{3}}$ (b) $\dfrac{25+\sqrt{3}}{22}$

    (c) $\dfrac{25+\sqrt{3}}{25-\sqrt{3}}$ (d) $\dfrac{\sqrt{25}+\sqrt{28}}{3}$

18. The value of $\dfrac{1}{\sqrt{6}+\sqrt{5}-\sqrt{11}}$ is

    (a) $\dfrac{6\sqrt{5}+5\sqrt{6}}{60}$

    (b) $\dfrac{6\sqrt{5}+5\sqrt{6}+\sqrt{330}}{60}$

    (c) $\dfrac{6\sqrt{5}+5\sqrt{6}+330}{60}$

    (d) $\dfrac{6\sqrt{5}+5\sqrt{6}+\sqrt{331}}{60}$.

19. The value of $\dfrac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}} + \dfrac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}$ is

    (a) $\sqrt{5}-\sqrt{6}$ (b) $\sqrt{5}+\sqrt{6}$

    (c) $\sqrt{6}-\sqrt{5}$ (d) None of these.

20. The value of $6\sqrt{27} \div 3\sqrt{12}$ is

    (a) 1   (b) 2
    (c) 3   (d) None of these.

21. The value of $\sqrt[3]{2}.\sqrt[4]{2}.\sqrt[12]{32}$

    (a) 1   (b) 2
    (c) 3   (d) None of these.

22. Which of the following is a surd.

    (a) $\sqrt{27} \times \sqrt{3}$

    (b) $4\sqrt{28} \div 3\sqrt{7}$

    (c) $\sqrt[3]{25} \times \sqrt[3]{5}$

    (d) $\sqrt{18} \times \sqrt{27} \div \sqrt{12}$.

23. The value of $\dfrac{\sqrt{5}}{3\sqrt{3}}$ is

    (a) $\dfrac{\sqrt{15}}{9}$ (b) $\dfrac{\sqrt{15}}{3}$

    (d) $\dfrac{\sqrt{5}}{9}$ (d) $\dfrac{\sqrt{5}}{3}$.

24. π is a/an .... number
    (a) rational   (b) irrational
    (c) integer   (d) None of these.

25. 90 is a/an .... number
    (a) rational   (b) irrational
    (c) natural   (d) None of these.

26. If $\dfrac{5+3\sqrt{3}}{7+4\sqrt{3}} = a + b\sqrt{3}$, then the value of a and b is :
    (a) 1, –1   (b) –1, 1
    (c) 1, 0   (d) 0, –1.

27. $\dfrac{\sqrt{3}-1}{\sqrt{3}+1} + \dfrac{\sqrt{3}+1}{\sqrt{3}-1} = a + \sqrt{3}\,b$, then the value of a and b is :
    (a) 0, 1   (b) 1, 0
    (c) –1, 0   (d) 4, 0.

28. How many rational numbers lie between two given rational numbers :
    (a) infinite   (b) four
    (c) six   (d) None of these.

29. Between two given rational numbers $\dfrac{1}{3}$ & $\dfrac{1}{4}$, find two more rational numbers :

    (a) $\dfrac{7}{24}, \dfrac{15}{48}$ (b) $\dfrac{1}{2}, \dfrac{1}{3}$

    (c) $\dfrac{1}{6}, \dfrac{1}{8}$ (d) None of these.

30. The value of $(25)^{-1/3} \times \sqrt[3]{16}$ is :

    (a) $\dfrac{2}{5} \times 10^{1/3}$ (b) $\dfrac{5}{2} \times 10^{1/2}$

    (c) $\dfrac{2}{5} \times 10^{1/4}$ (d) None of these.

31. 2 as a surd o 5th order can be expressed as

    (a) $\sqrt[5]{2}$ (b) $2\dfrac{1}{5}$

    (c) $\sqrt[5]{32}$ (d) none of these

32. The value of $4\sqrt{16} + 2\sqrt{81}$ is

    (a) 26   (b) 34
    (c) 24   (d) 32.

33 Which of the following number is the biggest

    (a) $(2+2+2)^2$ (b) $[(2+2)^2]^2$
    (c) $(2 \times 2 \times 2)^2$ (d) $(4)^3$

34 $(92)^2 - (85)^2$ is completely divisible by

    (a) 17   (b) 11
    (c) 10   (d) 50

35. The rationalising factor of $\sqrt[3]{49}$ is

    (a) $\sqrt{49}$ (b) $\sqrt[3]{7}$
    (c) 0   (d) none

36. If $\sqrt[4]{2x+1} = 2$, then the value of x is

    (a) x = $\dfrac{15}{2}$ (b) x=16

    (c) x= 0   d) None

37. Write down 0.272727............ in the form of $\dfrac{p}{q}$

    (a) $\dfrac{3}{11}$ (b) $\dfrac{27}{11}$

    (c) $\dfrac{27}{100}$ (d) $\dfrac{9}{11}$

Answers (Set I)

1.	(c)	2.	(a)	3.	(b)	4.	(a)	5.	(b)	6.	(b)
7.	(b)	8.	(c)	9.	(c)	10.	(c)	11.	(a)	12.	(b)
13.	(a)	14.	(a)	15.	(a)	16.	(b)	17.	(a)	18.	(a)
19.	(a)	20.	(c)	21.	(c)								

Answers (Set II)

1.	(c)	2.	(a)	3.	(b)	4.	(a)	5.	(a)	6.	(b)
7.	(b)	8.	(a)	9.	(b)	10.	(c)	11.	(b)	12.	(a)
13.	(d)	14.	(a)	15.	(a)	16.	(b)	17.	(b)	18.	(b)
19.	(a)	20.	(c)	21.	(b)	22.	(d)	23.	(a)	24.	(b)
25.	(a)	26.	(b)	27.	(d)	28.	(a)	29.	(a)	30.	(a)
31.	(c)	32	(b)	33	(b)	34	(d)	35	(b)	36	(a)
37	(a)										

ALGEBRA
LINEAR EQUATIONS IN TWO VARIABLES

Point to remember

1. <u>Linear Equation</u> : Equation of the form $ax + by + c = 0$, $a \neq 0$, $b \neq 0$ where a , b , c are real numbers is called a linear equation in two variables x and y.

2. <u>Solution of a linear equation</u> : $x = l$ and $y = m$ is a solution of $ax + by + c = 0$ if $al + bm + c = 0$

3. **Graph of a linear equation $ax + by + c = 0$.** The graph of a linear equation can be drawn by the following method :

   i) Draw two mutually perpendicular lines X´OX and YOY´ as coordinate axes.

   ii) Obtain three convenient pairs of values of x and y satisfying the given equation.

   iii) Plot these ordered pairs on the graph paper and join the points. The straight line is the required graph

4. <u>Checking whether the given points lie on the graph of the given equation.</u>

   Substitute the values of x and y in the given equation. If it satisfies the equation the point lies on the straight line and if it does not satisfy the equation, the point does not like on the straight line.

5. <u>Solving a System of equations graphically:</u> Let the given system of linear equations be $ax + by + c = 0$ and $px + qy + m = 0$ where a,b,p and $q \neq 0$. Draw the graphs of the two equations and let these be represented by lines l_1 and l_2. There are three following cases.

   i. When L_1 and L_2 are parallel

   In this case, the system of equations has no solution. Such system of equations is called inconsistent.

   ii) When L_1 and L_2 are coincident. In this case, the given system of equations has an infinite number of solutions.

   iii) When L_1 and L_2 intersect

   In this case, the system of equations has a unique solution given by the point of intersection of the two lines L_1 and L_2

6. <u>Solving system of simultaneous Linear equations Algebraically.</u>

   a) <u>Method of substitution</u>

   i) Find y in terms of x from one of the two equations.

   ii) Substitute this value of y in the other equation. Solve this equation for x.

   iii) Substitute this value of x in any of the given equations and solve it for y.

   Alternatively we may find x in terms of y. then we shall get value of y in step (ii) above and value of x in step (iii) above.

   b) <u>Comparison Method</u>

   Find the value of x or y from both the equations and eqvate to get value of one variable. Substitution of this value in any one equation will give value of the second variable.

   c) <u>Method of equalizing the co-efficient.</u>

   i) Multiply the given equations by some suitable constants so an to make the co efficients of one of the variables numerically equal.

   ii) Solve the equation obtained in step in one variable.

   iii) Solve the equation obtained in step (ii) in one variable.

iv) Substitute the value of this variable in any of the two equations and solve for the second variable.

d) A special case when coefficients of x and y are interchanged in two equations let the two equations be px + qy = m   and qx + py = x

i) Add the two equations to get
$(p + q) x + (q + p) y = m + n$
or $(p + q) (x + y) = m + n$

or $x + y = \dfrac{m + n}{p + q}$ ...(A)

ii) Subtract the equations to get
$(p - q) x + (-p + q) y = m - n$
or $(p - q) (x - y) = m - n$

or $x - y = \dfrac{m - n}{p - q}$ ...(B)

iii) Add A and B to get x and subtract B from A to get y.

e) <u>Cross Multiplication method</u> :-
The cross multiplication rule to solve the system of equations.
$a_1 x + b_1 y + c_1 = 0$
$a_2 x + b_2 y + c_2 = 0$

is given by

$$\dfrac{x}{b_1 c_2 - b_2 c_1} = \dfrac{y}{c_1 a_2 - c_2 a_1}$$

$$= \dfrac{1}{a_1 b_2 - a_2 b_1}$$

or $x = \dfrac{b_1 c_2 - b_2 c_1}{a_1 b_2 - a_2 b_1}$ and $y = \dfrac{c_1 a_2 - c_2 a_1}{a_1 b_2 - a_2 b_1}$

7. Let $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$

a) Then, the system of equations has no

solution if $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

b) The system of equations has a unique

solution if $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

c) The system of equations has an infinite number

of solutions , if $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$

<u>LINEAR EQUATIONS:-</u>

1. The graph of equation ax + by = c is
a) Circle   b) Straight line
c) Square   d) Parabola

2. If the point P(m, n) lies on the graph of ax + by = c, then solution of ax + by = c is
a) x = m, y = n   b) x = 0, y = 0
c) y = 0   d) x = 0

3. The graph of the equation y =a is line
a) Parallel to x- axis
b) Parallel to y – axis
c) Passing through origin
d) None of these.

4. The graph of the equation x = a, a>0 is on the
a) Right side of y- axis
b) left side of y- axis
c) Right side of x- axis
d) Left side of x- axis

5. If (a, 4) lies on the graph of 3x+y=10, then the value of a is :
a) -3   b) 1
c) 3   d) 4

6. The value for 'b' so that equation x+y =b may have x = 1, y = 1 as a solution.
a) b = 1   b) b = 2
c) b = 0   d) b = 3

7. If the equations $a_1 x + b_1 y = c_1$ and $a_2 x + b_2 y = c_2$ represents two parallel line then they have

a) No point of intersection
b) One point of intersection
c) Many points of intersection
d) None of these.

8. Solution for equations
   6x + 9y = 21 and 6x + 10y = 4 is
   a) x = -13 and y = -17
   b) x= 13 and y = 17
   c) x=-13 and y=17
   d) x= 17 and y = 13

9. The value of k for which the system of equations 2x+3y=5 and 4x+ky=10 has infinetly many solutions, then
   a) 1   b) 1/2
   c) 3   d) 6

10. Values of k, for which the system of equation kx + 2y = 5 and 3x + y = 1 has unique solution.
    a) k ≠ 6   b) k ≠ - 6
    c) k ≠ 5   d) k ≠ 4

11. Determine the values of a and b for which the following system of linear equations hs infinite many solutions
    a) k = 6   b) k = -6
    c) k = 5   d) k = -4

12. A linear equation in two variables has
    a) one solution
    b) two solution
    c) three solutions
    d) infinete solution

13. Value of 'a' for which system of equations ax + 3y = 15 and 2x − y =5 has infinitely many solution.
    a) a = -6   b) a = 6
    c) a = 3   d) a = -3

14. If three times of the age of son (in years) is added to the age of father, the sum is 85 and if the twice the age of father is added to the age of son the sum is 95. then the age of father and son is.

a) (40, 15)   b) (20, 10)
c) (30, 15)   d) (50, 25)

15. The sum of two numbers is 35 and their difference is 13 then numbers are
    a) (11,24)   b) (24, 11)
    c) (11, 12)   d) (24, 12)

16. 5 pens and 6 pencils costs Rs. 9 and 3 pens and 2 pencils costs Rs. 5. Find cost of one pen and one pencil separately is

    a) Rs. $\dfrac{3}{2}$, Rs $\dfrac{1}{4}$

    b) Rs. $\dfrac{1}{4}$, Rs. $\dfrac{3}{2}$

    c) Rs. 2, Rs. 1

    d) Rs. $\dfrac{2}{3}$ Rs. $\dfrac{3}{2}$

17. 4 chairs and 3 tables cost Rs. 2100/- and 5 chairs and 2 tables costs 1750/-. Find the cost of a chair and a table
    a) Rs. 500, Rs. 150
    b) Rs. 150, Rs. 500
    c) Rs. 150, Rs. 150
    d) Rs. 500, Rs. 500

18. 3 tables and 2 chairs together cost Rs. 2750 and 8 tables and 5 chairs together cost rs. 7200 then cost of 1 chair and 1 table separately is
    a) Rs. 6000, Rs. 4000
    b) Rs. 6500, Rs. 4000
    c) Rs. 6400, Rs. 4000
    d) Rs. 6600, Rs. 4000

19. Five years ago, A was trice as old as B and 10 years hence A shall twice as old as B then present ages of A and B are
    a) 30 years, 10 years
    b) 50 years, 20 years

c) 40 years, 10 years

d) 60 years, 10 years

20. In a two digit number, unit's digit is twice the ten's digit. If the digits are reversed new number is 27 more that the original number then the number is
   a) 30   b) 34
   c) 32   d) 36

21. Ten years ago, father was twelve times as old as his son and ten years hence he will be twice as old as his son will be. Present ages are
   a) 24 years, 12 years
   b) 34 years, 12 years
   c) 30 years, 12 years
   d) 36 years, 12 years

22. Solution of following pair of equation is
   $\dfrac{4}{x} + 3y = 14$ and $\dfrac{3}{x} - 4y = 23$
   a) x = 1/5, y = – 2 b) x = 5, y = –1/2
   c) x = 5, y = –2   d) x = –5, y = 1/2

23. Solution of following pair of equations is
   $\dfrac{1}{2x} + \dfrac{1}{2y} = 2$ and $\dfrac{1}{3x} + \dfrac{1}{2y} = \dfrac{13}{6}$
   a) x = –1/2, y = – 1/3
   b) x = 2, y = 3
   c) x = 1/2, y = 1/3
   d) x = –2, y = –3

24. A two digit number is four times the sum of its digits and twice the product of the digits, then the number is
   a) 36   b) 63
   c) 72   d) 54

25. Solution of following pair of equation is
   $\dfrac{3x}{2} - \dfrac{5y}{3} = -2$ and $\dfrac{x}{3} + \dfrac{y}{2} = \dfrac{13}{6}$
   a) x = 2, y = 3   b) x= –2 , y = – 3
   c) x = –2, y = 3   d) x = 2 , y = –3

26. Solution of the following equation is
   $\sqrt{2}\,x + \sqrt{3}\,y = 0$ and $\sqrt{3}\,x - \sqrt{8}\,y = 0$
   a) x = 1, y = 1
   b) x = 0 , y = 0
   c) x = 0, y = 1
   d) x = 1 , y = -1

27. If $2x - 3y = 7$ and $(a + b) x - (a + b - 3) y = 4a + b$ represent coincident lines, then a and b satisfy the equation :
   a) a + 5b = 0   b) 5a + b = 0
   c) a – 5b = 0   d) 5a – b = 0

28. Lines representing the following pairs of linear equations are
   $25x + 5y + 20 = 0$ and $10x + 25y + 25 = 0$
   a) Intersecting Lines
   b) Parallel Lines
   c) Coincident Lines
   d) None of these

29. Lines representing the following pairs of linear equations are
   $6x - 3y + 10 = 0$ and $2x - y + 9 = 0$
   a) Intersecting Lines
   b) Parallel Lines
   c) Coincident Lines
   d) None of these

30. For which values of 'k' will the following pair of linear equations have no solution
   $3x + y = 1$ and $(2k - 1)x + (k-1)y = 2k + 1$
   a) k = 2 and k ≠ -2, -1
   b) k = -2 and k ≠ 2
   c) k = 1 and k ≠ 1, -2
   d) k = -1 and k ≠ -2, -1

31. If the system of equations $3x + y = 1$ and $(2x - 1) x + (k - 1) y = 2 k + 1$ is inconsistent, then k is
   a) 1   b) 0
   c) –1   d) 2

32. Solve the following pair of equations

$\dfrac{9}{x+1} - \dfrac{8}{y-1} = 1$ and $\dfrac{3}{x+1} + \dfrac{4}{y-1} = 2$

and $x \ne -1, y \ne -1$
a) $x = -5, y = -2$
b) $x = 5, y = 2$
c) $x = -5, y = 2$ d) $x = 5, y = -2$

33. A fraction becomes $\dfrac{1}{3}$ when 11 subtracted from the numerator and it becomes 1/4 when 8 is added to its denominator, then the fraction is

a) $\dfrac{12}{5}$ b) $\dfrac{-12}{5}$

c) $\dfrac{17}{5}$ d) $\dfrac{5}{12}$

34. For which value of 'a' the system of equations $4x + 9y + 5 = 0$ and $2x + 3y + 7 = 0$ has exactly one solution.
a) $a \ne 6$ b) $a \ne -6$
c) $a \ne 3$ d) $a \ne -3$

35. If (4,19) is a solution of the equation $y = ax+3$ then $a =$
a) 3   b) 4
c) 5   d) 6

36. If (x-3) is a factor of $x^3 + ax^2 + bx + 18$ and $a + b = -7$ then values of a and b are
a) $a = 3, b = 4$ b) $a = -3, b = 4$
c) $a = -4, b = -3$ d) $a = 3, b = -4$

37. On comparing the rations $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$ which pair of linear equations are inconsistent
a) $3x + 2y = 5$ and $2x - 3y = 7$
b) $\dfrac{3x}{2} + \dfrac{5y}{3} = 7$ and $9x - 10y = 14$

c) $\dfrac{4}{3}x + 2y = 8$ and $2x + 3y = 12$
d) $2x - 3y = 8$ and $4x - 6y = 9$

38. If $5^{x-y} = 25$ and $5^{3x+2y} = 5$, then
a) $x = 1, y = -1$
b) $x = -1, y = 2$
c) $x = -1, y = -1$
d) none of these

39. The value of k for which the system of equations $3x + 5y = 0$ and $kx + 10y = 0$ has a non-zero solution is :
a) 0   b) 2
c) 6   d) 8

40. Algebraic interpretation for the following pair of equations $3x - 5y = 20$ and $6x - 10y = 40$ is
a) Have unique solution
b) Have infinitely many solutions
c) Have no solution
d) None of these

41. If the graph of two linear equations meet at a point then equations are
a) Inconsistent
b) Consistent
c) Dependent
d) None of these

42. If the graph of two linear equations are parallel then equations are
a) Inconsistent   b) Consistent
c) Dependent   d) None of these

43. If two linear equations have unique solution, then their graphs.
a) Meet at a point
b) Meet nowhere
c) Are Parallel
d) None of these

44. If two linear equations have no solution, then their graphs.
    a) Meet at single point
    b) Are Parallel
    c) Meet no where
    d) Are coincident lines

45. The graph of these equations $5x + 2y = 16$, $7x - 4y = 2$ will
    a) Meet at one point
    b) Meet no where
    c) Parallel lines
    d) Be coincident lines.

46) If $\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{x}}} = 2$, then find the value of x

    a) $\dfrac{1}{3}$
    b) $-\dfrac{1}{3}$
    c) -3
    d) 1

47. Following the equations $x + y = 5$, $x - y = 5$ and $x = 0$, the vertex of triangle on x-axis will be :-
    a) 0 , 5
    b) 5 , 0
    c) 0 , -5
    d) 0 , 0

48. Sum of two numbers is 35 and their difference is 13. Find the numbers.
    a) 24, 11
    b) 26,13
    c) 42, 29
    d) 10, 25

49. Determine the values of a and b for which the following system of linear equations has infinite solutions $2x - (a - 4) y = 2b + 1$ and $4x - (a - 1) y = 5b - 1$
    a) 4, 3
    b) 6, 4
    c) 7, 3
    d) 5, 7

50. Find the value of k for which the system of equations has a unique solution $x + 2y = 3$, $5x + ky + 7 = 0$
    a) $k \ne 10$
    b) $k \ne 12$
    c) $k \ne 2$
    d) $k \ne 0$

LINEAR EQUATION

1	b	11	a	21	b	31	d	41	b
2	a	12	d	22	a	32	b	42	a
3	a	13	b	23	c	33	d	43	a
4	a	14	a	24	a	34	a	44	a
5	c	15	b	25	a	35	b	45	d
6	b	16	a	26	c	36	c	46	b
7	a	17	b	27	c	37	d	47	b
8	c	18	b	28	c	38	a	48	a
9	d	19	b	29	b	39	a	49	c
10	b	20	d	30	a	40	b	50	a

POLYNOMIALS AND RATIONAL EXPRESSIONS

Points to remember

i) A polynomial of degree 1, 2 and 3 is called a linear polynomial , quadratic and cubic polynomial respectively.

ii) A real number 'α' is a zero of the polynomial $p(x)$ if $p(\alpha) = 0$.

iii) The zeroes of polynomial $p(x)$ are precisely the x- coordinates of the points where the graph of $y = p(x)$ intersects the x – axis.

iv) If 'α' and β are the zeroes of a quadratic polynomial $ax^2 + bx + c = 0$, $a \neq 0$ then

Sum of zeroes = $\alpha + \beta = \dfrac{-b}{a}$ and

Product of zeroes = $\alpha\beta = \dfrac{c}{a}$

v) A polynomial of degree 'n' can have at most 'n' zeroes. So, a quadratic polynomial has at most 2 zeroes and a cubic polynomial can have at most 3 zeroes.

vi) If α, β, γ are the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d = 0$ then

$\alpha + \beta + \gamma = \dfrac{-b}{a}$, $\alpha\beta + \beta\gamma + \gamma\alpha = \dfrac{c}{a}$ and

$\alpha\beta\gamma = \dfrac{-d}{a}$

vii) Divided = Quotient x Divisor + Remainder

viii) $p(x) = q(x) . g(x) + \gamma(x)$

Where , either $\gamma(x) = 0$ or degree of $r(n) <$ degree of $g(x)$. This result is known as division algorithm for polynomials.

Rational Expression

An expression of the form $p(x) = \dfrac{f(x)}{g(x)}$ where $f(x)$ and $g(x)$ are polynomials and $g(x) \neq 0$, is called a rational expression.

Operations on Relational Expressions

i) Addition

$$\frac{p(x)}{q(x)} + \frac{r(x)}{s(x)} = \frac{p(x)s(x) + q(x)r(x)}{q(x)s(x)}$$

ii) Subtraction

$$\frac{p(x)}{q(x)} - \frac{r(x)}{s(x)} = \frac{p(x)s(x) - q(x)r(x)}{q(x)s(x)}$$

iii) Multiplication

$$\frac{p(x)}{q(x)} \times \frac{r(x)}{s(x)} = \frac{p(x)r(x)}{q(x)s(x)}$$

iv) Division

$$\frac{p(x)}{q(x)} \div \frac{r(x)}{s(x)}$$

$$= \frac{p(x)}{q(x)} \times \frac{s(x)}{r(x)} = \frac{p(x)s(x)}{q(x)r(x)}$$

v) Opposite or additive inverse of $\dfrac{p(x)}{q(x)}$ is

$\dfrac{-p(x)}{q(x)}$ and reciprocal or multiplicative

inverse of $\dfrac{p(x)}{q(x)}$ is $\dfrac{q(x)}{p(x)}$

vi) The sum, difference, product and division of two rational expressions is always a rational expression except where divisor in case of division is a zero polynomial – here division is not defined.

vii) A rational expression is not defined for those points which makes the denominator zero.

REMAINDER THEOREM

The remainder obtained an dividing a given polynomial $f(x)$ by x-a is given by $f(a)$.

Factor Theorem

x-a is a factor of the polynomial f(x) if and only if f(a) = 0.

SOME FORMULA

i) $(a+b)^2 = a^2 + 2ab + b^2$
ii) $(a-b)^2 = a^2 - 2ab + b^2$
iii) $a^2 - b^2 = (a+b)(a-b)$
iv) $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$
v) $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$
vi) $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
vii) $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
viii) $x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx) = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$
ix) $a^4 + a^2 + 1 = (a^2 - a + 1)(a^2 + a + 1)$

1. If there is no common factor then HCF of polynomials is
   a) 0   (b) 1
   c) 2   (d) –1

2. H.C.F of polynomials $4(x-3)^2 (x-1)(x+1)^3$ and $6(x-1)^2(x+1)^2(x+7)$ is
   a) $(x - 1)(x + 1)$
   b) $2(x - 1)(x + 1)$
   c) $2(x - 1)(x + 1)^2$
   d) $2^2 (x - 1)^2 (x + 1)^2$

3. H.C.F of p(x) and q(x) where $p(x) = x^2 - 5x+6$ and $q(x) = x^2 + 5x-14$
   a) $(x-2)^2$ b) $(x-2)^3$
   c) $(x-2)$ d) $(x+2)$

4. Non-Zero constant is a polynomial of degree

   a) 1   b) 0
   c) 2   d) Infinite

5. Degree of polynomial $x^4 + 2x^2 - 7$ is
   a) 4   b) 2
   c) -7   d) 1

6. Degree of polynomial $a_0 + a_1x + a_2 x^2 + a^3x^3 + \underline{\hspace{2cm}} + a_n x^n$ where n>0 is
   a) an   b) 1
   c) n   d) n^2

7. Degree of polynomial (x-1)(x-2)(x-3) is
   a) 1   b) 2
   c) 3   d) 0

8. H.C.F of polynomials $10(x^2 - 1)^2$ and $15(x+1)^3(x-1)$
   a) $5(x + 1)^2 (x - 1)$
   b) $5(x + 1)(x - 1)$
   c) $5(x + 1)^2 (x - 1)^2$
   d) $(x + 1)^2 (x - 1)$

9. L.C.M of $p(x) = 4(x-1)^2 (x^2 + 6x + 8)$ and $q(x) = 10(x-1)(x+2)(x^2 + 7x + 10)$ is
   a) $20(x - 1)^2 (x + 2)^2 (x + 4)(x + 5)$
   b) $20(x - 1)(x + 2)^2 (x + 4)(x + 5)$
   c) $20(x - 1)(x + 2)(x + 4)(x + 5)$
   d) $20(x - 1)(x + 2)^2 (x + 4)$

10. L.C.M of $p(x) = 12(x^4 - x^3)$ and $q(x) = 18(x^4 - 3x^3 + 2x^2)$ is
    a) $36x^3 (x - 1)(x - 2)$
    b) $36x(x - 1)(x - 2)$
    c) $x^3 (x - 1)(x - 2)$
    d) $6x(x - 1)(x - 2)$

11. L.C.M of $p(x) = (x^2 + x + 1)(x+1)$ and $q(x) = (x-1)$ is
    a) $(x + 1)(x^2 + x + 1)$
    b) $(x + 1)(x^2 + x + 1)(x - 1)$
    c) $(x + 1)(x - 1)$
    d) $(x^2 + x + 1)$

12. If p(x) and q(x) are two polynomials and $q(x) \neq 0$, then $\dfrac{p(x)}{q(x)}$ is known as
    a) Rational Number
    b) Rational expression
    c) Polynomial
    d) None of these

13. Every polynomial is a rational expression, but each rational expression……..
    a) Is also a polynomial
    b) Need not be a polynomial
    c) Must be a polynomial
    d) None of these

14. $\dfrac{x^3 + 3\sqrt{x} + 1}{x^2 + 1}$ is not a rational expression because
    a) Its numerator is not a polynomial
    b) Its denominator is not a polynomial
    c) Neither numerator nor denominator is polynomial
    d) None of these

15. Rational expression $\dfrac{x^3 - 27}{x^2 - 9}$ in its lowest terms
    a) $\dfrac{x^2 + 3x + 9}{x - 3}$ b) $\dfrac{x^2 - 3x + 9}{x - 3}$
    c) $\dfrac{x^2 - 3x + 9}{x + 3}$ d) $\dfrac{x^2 + 3x + 9}{x + 3}$

16. Additive inverse of algebraic expression $\dfrac{2x^2 - 3}{x^2 + 4}$ is
    a) $\dfrac{2x^2 - 3}{x^2 + 4}$ b) $\dfrac{x^2 + 4}{2x^2 - 3}$
    c) $\dfrac{-2x^2 - 3}{-x^2 - 4}$ d) $\dfrac{-2x^2 - 3}{x^2 + 4}$

17. Additive Inverse of algebraic expression $\dfrac{-x + 4}{4x + 6}$
    a) $\dfrac{x - 4}{4x + 6}$ b) $\dfrac{x - 4}{4x - 6}$
    c) $\dfrac{-x - 4}{-4x - 6}$ d) $\dfrac{-x + 4}{4x + 6}$

18. Which of the following is a polynomial ?
    a) x^2-xy+7y^2 b) 2x+3y
    c) 7x^3-2x^2+3√x-4   d) x^2-x+2/x

19. The value of the polynomial 5x-4x^2+3 at x = -1 is
    a) 6   b) -6
    c) 8   d) 12

20. Which of the following is a rational polynomial.
    a) $\dfrac{x^3 + 2x^2}{2x\sqrt{x} + 3}$ b) $\dfrac{x^2 - 1}{\sqrt{5x} - 4}$
    c) $\dfrac{x^2 - 3x + 2}{x + 1}$ d) $\dfrac{x^3 + 3x^2 - 1}{x^2 + \sqrt{3}x - 1}$

21. Factors of a^2-1-2x-x^2 are
    a) (a-x+1)(a-x-1)
    b) (a+x-1)(a-x+1)
    c) (a+x+1)(a-x-1)
    d) None of these

22. The rational expression $\dfrac{x^3 - 8}{x^2 - 4}$ in its lowest form is
    a) $\dfrac{x^2 - 2x + 4}{x + 2}$ b) $\dfrac{x^2 + 2x - 4}{x + 2}$
    c) $\dfrac{x^2 - 2x + 4}{x + 2}$ d) $\dfrac{x^2 - 2x - 4}{x + 2}$

23. Write the rational expression $\dfrac{x^3 + 1}{(x+1)^2}$ in its simplest form :
    a) $\dfrac{x - 1}{x + 2}$ b) $\dfrac{x^2 + x + 1}{x + 1}$
    c) $\dfrac{x^2 - x + 1}{x + 1}$ d) None of these

24. The rational expression $\dfrac{x + 4}{x + 2} - \dfrac{(x - 1)}{x - 2}$ is
    a) $\dfrac{x + 6}{x^2 - 4}$ b) $\dfrac{x - 6}{x^2 + 4}$
    c) $\dfrac{x + 6}{x^2 + 4}$ d) $\dfrac{x - 6}{x^2 - 4}$

25. The rational expression $\dfrac{x+1}{(x-1)^2} + \dfrac{1}{x+3}$ is

a) $\dfrac{2(x^2+x+2)}{x^3+x^2-5x+3}$ b) $\dfrac{2(x^2+x+2)}{x^2-5x+3}$

c) $\dfrac{(x^2+x+2)}{x^3+x^2-5x+3}$ d) $\dfrac{2(x^2+x+2)}{x^3-5x+x^2+3}$

26. The rational expression

$\dfrac{x^2+x-1}{x^2-1} + \dfrac{x+1}{x-1}$ is

a) $\dfrac{2x^2-3x}{x^2-1}$ b) $\dfrac{2x^2-3x}{x^2-1}$

c) $\dfrac{x^2+3x}{x^2-1}$ d) $\dfrac{x^2-3x}{x^2-1}$

27. Which rational expression must be added

in $\dfrac{x-1}{x-2}$ so that their sum is $\dfrac{2x^2+2x-7}{x^2+x-6}$

a) $\dfrac{x-2}{x-3}$ b) $\dfrac{x+2}{x-3}$

c) $\dfrac{x+2}{x+3}$ d) $\dfrac{x-2}{x-3}$

28. The factors of x^4+x^2+25 are
 a) $(x^2+3x+5)(x^2-3x+5)$
 b) $(x^2+3x+5)(x^2+3x-5)$
 c) $(x^2+x+5)(x^2-x+5)$
 d) None of these

29. Write multiplicative inverse of $\dfrac{x^2-1}{x-1}$

a) $\dfrac{1}{x+2}$ b) $\dfrac{1}{x-1}$

c) $\dfrac{1}{x+1}$ d) $\dfrac{x-1}{x+1}$

30. If one of the factors of $x^4 + x^2 - 20$ is $(x^2 + 5)$, the other factor is
 a) $x^2 - 5$ b) $x^2 + 4$
 c) $x^2 - 4$ d) $x + 2$

31. If (x-2) is a factor of $2x^3 - 6x^2 + 5x + k$, then the value of k
 a) 0 b) 1
 c) 2 d) -2

32. Find the value of 'a' if x=½ is a root of the polynomial $8x^3 + ax^2 - 4x + 2$ is
 a) a=4 b) a=-4
 c) a=2 d) a=-2

33. Divide the polynomial $p(x) = x^3 - 3x^2 + 4x - 12$ by factor (x- 3) then remainder is
 a) 1 b) -1
 b) 2 d) 0

34. Using remainder theorem find remainder if $(x^3 - 6x^2 + 9x + 3)$ is divided by (x-1)
 a) 7 b) 6
 c) 5 d) 0

35. The factors of $x^3 - 7x + 6$ are
 a) x(x-6)(x-1)
 b) $(x^2-6)(x-1)$
 c) (x+1)(x+2)(x-3)
 d) (x-1)(x+3)(x-2)

36. Zeros of a polynomial x–5 are
 a) 5 b) 0
 c) 1 d) None of these

37. H.C.F of $8(x^3 - x^2 + x)$ and $28 (x^3 +1)$ is
 a) $x^3 + 1$ b) x + 1
 c) $x^2 - x + 1$ d) $4(x^2 - x + 1)$

38. L.C.M of $(1 - x^3)$, $(1+x)$ and $(1-x + x^2)$ is
 a) $(1 - x^3)$ b) $(1+x^3)$
 c) $(1- x^6)$ d) x + 1

39. H.C.F of $(x-1) (x^2 -1)$ and (x^3-1) is
 a) $(x^2 - 1)$ b) (x - 1)
 c) $(x^3 - 1)$ d) x + 1

40. The remainder when $x^3 - ax^2 + 6x - a$ is divided by $x - a$
    a) 5a
    b) 4a
    c) 0
    d) 6a

41. The factors of $x^4 + 4$ are
    a) $(x^2+2x+2)(x^2-2x+2)$
    b) $(x^2+2x+2)(x^2+2x-2)$
    c) $(x^2-2x-2)(x^2-2x+2)$
    d) $(x^2+2)(x^2-2)$

42. Write factors of $(x^4 + x^2 + 1)$
    a) $(x^2 - x + 1)(x^2 + x + 1)$
    b) $(x + 2)(x + 3)$
    c) $(x - 1)(x^2 + x + 1)$
    d) $(x + 1)(x^2 - x + 1)$

43. If one root of the polynomial $f(x) = 5x^2 + 13x + k$ is reciprocal of the other, then the value of k is
    a) 0
    b) 5
    c) 1/6
    d) 6

44. Find the reminder when polynomial $f(x) = 2x^4-6x^3+2x^2-x+2$ is divided by
    a) 92
    b) 24
    c) 48
    d) 29

45. If $(x - 2)$ is factor of $(x^2 + 3ax-2a)$ then $a =$
    a) 2
    b) -2
    c) 1
    d) -1

46. When $x^{51} + 51$ is devided by $(x + 1)$, then remainder is
    a) 52
    b) 53
    c) 50
    d) None of these

47. If $p(t)=3t^2-2t+1$, $q(t)=3t^2+t-1$, then degree of polynomial $p(t)-q(t)$ is
    a) 0
    b) 2
    c) 1
    d) undefined

48. If $p(x)=2x^3+x^2-2x+1$, $q(x)=x^3-3x^2+2x-1$ then the degree of $p(x)q(x)$ is:
    a) 9
    b) 0
    c) 5
    d) 6

49. If $P(x) = 7x^3+4x^2-3x+12$ then the degree of $P(x)$ is
    a) 2
    b) 3
    c) 1
    d) 4

50. The area of a square is $(49x^2 + 28x + 4)$ it's side is :
    a) $(7x + 3)$
    b) $(7x - 2)$
    c) $(7x + 2)$
    d) $(5x + 7)$

POLYNOMIAL AND RATIONAL EXPRESSION

1	B	11	B	21	c	31	d	41	a
2	C	12	B	22	a	32	b	42	a
3	C	13	B	23	c	33	d	43	b
4	a	14	A	24	d	34	a	44	a
5	A	15	d	25	a	35	d	45	d
6	C	16	d	26	b	36	a	46	c
7	C	17	a	27	c	37	d	47	c
8	A	18	a	28	c	38	c	48	d
9	A	19	b	29	c	39	b	49	b
10	A	20	c	30	c	40	a	50	c

QUADRATIC EQUATIONS

POINTS TO REMEMBER

i) The general term of a quadratic equation is $ax^2 + bx + c = 0$ where a,b,c , are real numbers and a $\neq 0$

ii) If we can factorise $ax^2 + bx + c = 0$, a $\neq 0$ into a product of linear factors then the roots of the above quadratic equation can be found by equating each factor to zero.

iii) <u>By the method of completing the square:</u>We can find whether the given quadratic equations has real roots and find them if they exist.

iv) <u>Quadratic formula</u> : The roots of a quadratic equation $ax^2 + bx + c = 0$, a $\neq 0$ are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, \text{ provided } b^2 - 4ac \geq 0$$

v) <u>Nature of Roots</u>:-A quadratic equation $ax^2 + bx + c = 0$, a $\neq 0$ has
a) Two distinct real roots, if $b^2 - 4ac > 0$
b) Two real and equal roots, if $b^2 - 4ac = 0$
c) No real roots, if if $b^2 - 4ac < 0$
d) The quantity $b^2 - 4ac$ is called discriminant.

vi. If α , β are the roots of quadratic equation $ax^2 + bx + c = 0$ then

sum of roots $= \alpha + \beta = \dfrac{-b}{a} = \dfrac{\text{-coeff.of x}}{\text{coeff. Of x}^2}$

and product of the roots =

$\alpha\beta = \dfrac{c}{a} = \dfrac{\text{constant terms}}{\text{coeff. of x}^2}$

vii. <u>Formation of an equation when roots are known</u>. If known roots are 'α ' and 'β' then the quadratic equation would be x^2 - (sum of roots)x + product of roots = 0
i.e. $x^2 - (\alpha + \beta) + \alpha . \beta = 0$
i.e. $x^2 - Sx + P = 0$

viii) If a quadratic equation has equal roots, then quadratic equation is a perfect square :

ix) $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$

$\alpha^3 + \beta^3 = (\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta)$

$\alpha^3 - \beta^3 = (\alpha - \beta)^3 + 3\alpha\beta(\alpha - \beta)$

$\alpha^2\beta + \beta^2\alpha = \alpha\beta(\alpha + \beta)$

$(\alpha + \beta)^2 - (\alpha - \beta)^2 = 4\alpha\beta$

1. The degree of quadratic equation is
a) 1   b) 0
c) 3   d) 2

2. Which of the following is quadratic equation
a) $x^2 - 4x + 3 = 0$

b) $x^2 + \dfrac{1}{x} = 5$ (x $\neq$ 0)

c) $x^2 + \dfrac{1}{x} = 0$ (x $\neq$ 0)

d) $x (x^2 + 2) + 1$

3. Which of the following is quadratic equation.
a) $x^2 - 6x + 4 = 0$
b) $2x^2 - 7x = 0$
c) $x + 3/x = x^2$
d) $x^2 + 1/x^2 = 2$

4. How many real roots of a quadratic equation are possible :
a) 1   b) 2
c) 3   d) 4

5. How many zeros of a cubic polynomial can have :
a) 1   b) 2
c) 3   d) 4

6. Solutions of the quadratic equation $4x^2 - 25 = 0$
a) x = $\pm$ 5/2   b) x = $\pm$ 3/2
c) x = $\pm$ 2/5   d) x = $\pm$ 1/2

7. Solutions of quadratic equation $x^2+6x+5=0$ are
   a) -1,-5   b) 5,1
   c) 1,5   d) -5,-1

8. If equation $x^2+4x+k=0$ has real and distinct roots then
   a) $K < 4$ b) $K > 4$
   c) $K \geq 4$ d) $K \leq 4$

9. Solution of quadratic equations $x^2 = 4$ are
   a) $x = \pm 6$ b) $x = \pm\sqrt{2}$
   c) $x = 6, 6$ d) $x = \pm 2$

10. Solution of quadratic equation $z^2 + k^2 = 0$ are
    a) $z = k, k$ b) $z = \pm k$
    c) $z = \pm \sqrt{k}$ d) No real roots of z

11. Find the discriminant of the quadratic equation $x^2 - 5x + 6 = 0$
    a) 2   b) 0
    c) 3   d) 1

12. If discriminant of a quadratic equation is less then zero then which of the following statement is true.
    a) Roots are real
    b) Roots are real but unequal
    c) Roots are imaginary
    d) Roots are real and equal

13. The roots of equation $x^2 - 7x - 8 = 0$
    a) 2 ,-4   b) -1, 8
    c) 1, -8   d) 1, 7

14. The roots of quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ are real if
    a) $b^2 - 4ac \geq 0$
    b) $b^2 - 4ac < 0$
    c) $\sqrt{b^2 - 4ac} < 0$
    d) $-b \pm \sqrt{b^2 - 4ac} \geq 0$

15. If p and q the root of the equation $x^2-px+q = 0$ then
    a) $p = 1, q = -2$ b) $p = 0, q = 1$
    c) $p = -2, q = 0$ d) $p = -2, q = 1$

16. If $x^2 + k(4x+k-1)+2 = 0$ has equal roots then k=
    a) $-\dfrac{2}{3}, 1$ b) $\dfrac{2}{3}, -1$
    c) $\dfrac{3}{2}, \dfrac{1}{3}$ d) $-\dfrac{3}{2}, -\dfrac{1}{3}$

17. The values of k for which $x = 2$ is a solution of the equation $kx^2 + 2x - 3 = 0$
    a) $k = 1/4$ b) $k = 1/7$
    c) $k = -1/4$ d) $k = -1/7$

18. The sum of the squares of two natural numbers is 34. if the first number is one less than twice the second number then the numbers are.
    a) $(5, 2)$ b) $(3, 4)$
    c) $(6, -2)$ d) $(5, 3)$

19. The sum of two natural numbers is 8. if the sum of their reciprocal is 8/15 then numbers are
    a) $(2, 6)$ b) $(7, 1)$
    c) $(5, 3)$ d) $(4, 4)$

20. The sum of the squares of three consecutive the integers is 50. the integers are
    a) 3, 4, 5   b) 2, 3, 4
    c) 4, 5, 6   d) 7, 8, 9

21. Roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$
    a) $\dfrac{5}{\sqrt{2}}, \sqrt{2}$ b) $\dfrac{5}{\sqrt{2}}, -\sqrt{2}$
    c) $\dfrac{1}{\sqrt{2}}, \sqrt{2}$ d) $\dfrac{-1}{\sqrt{2}}, -\sqrt{2}$

22. Two consecutive positive integers whose sum of squares is 365 are
    a) (11, 12)   b) (13, 14)
    c) (12, 13)   d) (9, 10)

23. If a rectangular mango grove has its length twice of its breadth and area 800 m^2 then its length and breadth are
    a) (10m, 20m)   b) (200m, 400m)
    c) (200m, 40m)   d) (30m, 60m)

24. If two numbers are differ by 3 and their product is 54. then the numbers are
    a) (6, 9)   b) (3, 6)
    c) (7, 10)   d) (5, 8)

25. Find the value of 'K' for which the given equation $(k + 1) x^2 - 2 (k-1) x + 1 = 0$ has real and equal roots.
    a) $k = 2$ b) $k = 3$
    c) $k = 1$ d) $k = 4$

26. Find the values of k for which the following equation has equal roots $(k - 12) x^2 + 2 (k - 12) x + 2 = 0$
    a) $k = 12, 14$ b) $k = 6, 12$
    c) $k = 6, 14$ d) $k = 0, 8$

27. The equation whose roots are $2\sqrt{3}$ and $-2\sqrt{3}$ is :
    a) $x^2 - 4\sqrt{3} x - 6 = 0$ b) $x^2 - 4\sqrt{3} x - 12 = 0$
    c) $x^2 - 12 = 0$ d) $x^2 - 6 = 0$

28. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, then the other two sides.
    a) 3 cm, 10 cm
    b) 4 cm, 11cm
    c) 2 cm, 9 cm
    d) 5 cm, 12cm

29. If the sum of the squares of 3 consecutive natural numbers is 110. then the smallest number is
    a) 4   b) 6
    c) 9   d) 5

30. The roots of the equation $\sqrt{4 - x} + \sqrt{x - 9} = 5$ are
    a) 0, 2   b) 0, -2
    c) 0, -5   d) 0, 5

31. If α, β are roots of the quadratic equation $x^2 + x + 1 = 0$ then value of $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$
    a) −1   b) 1
    b) 2   d) 0

32. If α, β are the roots of the quadratic equation $2x^2 - 3x + 1 = 0$, then value of $\alpha^2 \beta + \alpha \beta^2$
    a) 3/4   b) −3/4
    c) 1/4   d) −1/4

33. If α, β are the roots of equation $x^2 - 4x - 5 = 0$ then value of $\alpha^3 + \beta^3$ is
    a) − 4   b) 4
    c) 2   d) -2

34. If α, β are the roots of equation $x^2 - 4x - 5 = 0$ then value of $\alpha^3 - \beta^3$ is
    a) 256   b) 156
    c) 150   d) 166

35. If 1 root of the equation $x^2 + ax + 3 = 0$ is 1 then its other root is
    a) 3   b) -3
    c) 2   d) -2

36. If one root of $5x^2 + 13x + k = 0$ is reciprocal of the other then
    a) $k = 0$ b) $k = 5$
    c) $k = 1/6$ d) $k = 6$

37. If α, β are the roots of the equations $x^2 + 5x + 5 = 0$, then the quadratic equation whose roots are 2α and 2β is
    a) $x^2 - 10x + 20 = 0$
    b) $x^2 - 10x - 20 = 0$
    c) $x^2 + 10x + 20 = 0$
    d) $x^2 + 10x + 20 = 0$

38. The value of $\sqrt{6 + \sqrt{6 + \sqrt{6.........}}}$ is
    a) 4   b) 3
    c) -2   d) 1

39. If the sum of roots of a quadratic equation is 10 and the difference is 2. then the quadratic equation is
    a) $x^2 + 10x + 24 = 0$
    b) $x^2 + 10x - 24 = 0$
    c) $x^2 - 10x - 24 = 0$
    d) $x^2 - 10x + 24 = 0$

40. The condition that the one root of $ax^2 + bx + c = 0$ is thrice the other root is
    a) $3b^2 = 16a$ b) $3b^2 = 16ac$
    c) $3b = 16ac$ d) $3b^2 = 16c$

41. The set of values of k for the given quadratic equation has no real roots $x^2 + 5kx + 16 = 0$
    a) $k \geqslant \dfrac{8}{5}$ b) $-\dfrac{8}{5} < k < \dfrac{8}{5}$
    c) $k \leqslant \dfrac{8}{5}$ d) $k = \dfrac{8}{5}$

42. The sum of two numbers is 15. if the sum of their reciprocal is 3/10 then two numbers are
    a) 5, 10   b) 6, 9
    b) 8 , 7   d) 12, 3

43. If p and q are the roots of the equation $x^2 - px + q = 0$, then
    a) $p = 1, q = -2$
    b) $p = 0, q = 1$

c) $p = -2, q = 0$
d) $p = -2, q = 1$

44. The quadratic equation with sum of roots ¼ and product of its roots -1
    a) $x^2 - x = 0$ b) $4x^2 - x + 4 = 0$
    c) $4x^2 - x - 4 = 0$ d) $4x^2 + x + 4 = 0$

45. If α , β are the roots of quadratic equation $2x^2 + 6x + 4 = 0$ then find the sum of roots $\alpha + \beta$ is
    a) 3   b) 3.5
    c) 6   d) -3

46. If $ax^2 + bx + c = 0$ has equal roots then the value of c is
    a) $\dfrac{-b}{2a}$ b) $\dfrac{b}{2a}$
    c) $\dfrac{-b^2}{4a}$ d) $\dfrac{b^2}{4a}$

47. The solutions of quadratic equation $x^2 = 2$ are :
    a) 2   b) 3
    c) –2   d) None of these

Quadratic Equation

1	d	14	c	27	c	40	b
2	a	15	a	28	d	41	b
3	a	16	b	29	d	42	a
4	b	17	c	30	c	43	a
5	c	18	d	31	a	44	c
6	a	19	c	32	b	45	d
7	a	20	a	33	a	46	d
8	a	21	a	34	b	47	d
9	d	22	b	35	a		
10	d	23	c	36	b		
11	d	24	a	37	d		
12	a	25	b	38	b		
13	b	26	a	39	d		

COMMERCIAL MATHEMATICS

Points to remember

i.) If selling price (S.P) > cost price (C.P) then profit = S.P – C.P

If S.P < C.P , then

Loss = C. P – S.P

Profit or loss is expressed as percent of the C.P

Profit % = $\dfrac{\text{Profit}}{\text{C.P}}$ x 100

Loss % = $\dfrac{\text{Loss}}{\text{C.P}}$ x 100

ii.) **Discount** :
Discount = List price + rate of discount
S.P = list price – discount

iii) Simple Interest : When the principal remains the same for the entire loan period or time, then interest is called simple interest.

S.I $= \dfrac{P \times R \times T}{100}$

P = Principal Amount
R% = Rate of interest per annum
T = Times in years

iv) **Compound Interest:** When a certain interval of time due to addition of (compounding) of interest to the principal, new principal is formed which does not remain the same for the entire loan period, then the interest so obtain on new principal is called the compound interest.

$$A = P\left(1+\frac{R}{100}\right)^{N}$$

Where A = Amount
P = Principal
N = Time
R% = Rate of Interest.

Compound Interest (C.I) = A – P

$$C.\ I. = P\left(1+\frac{R}{100}\right)^{N} - P$$

v) Cash Price : If we purchase an object by paying whole of its price in cash , the price is called is cash price.

vi) Cash Down Payment: The amount of cash to be paid under the installment plan at the time of purchase is called cash down payment.

vii) Installments: The payments which the buyer has to make at regular intervals are called installments.

viii) Classification of taxes
Mainly the taxes may be classified in two ways
a) Direct Taxes   b) Indirect Taxes

a) Direct Taxes : A tax that is imposed on an individual or a group of individual which they have to pay to Government directly.
e.g. Income Tax, Wealth tax, Property tax etc.

b) Indirect tax : Those taxes which are paid indirectly by individuals.
e.g. Sales tax, Octroi tax, Education Cess, Central Excise Tax etc.

ix) Income Tax: When income from all sources exceeds a certain specified limit then he/she/they has to pay a part of his/their income as Income Tax to the government.

Rate of Income Tax :
Rate for single man (Age Less than 65 years)

Total Income	Tax
Upto 1,10,000	Nil
1,10,000 to 1,50,000	10% of amount (Rs. 4000) exceeding 1,10,000
1,50,000 to 2,50,000	Rs. 4000+20% of amount exceeding Rs. 1,50,000 (Rs 20000)
Exceeding Rs. 2,50,000	Rs. 4000 +Rs. 20000 + 30% amount exceeding Rs. 2,50,000

Rate for Single Woman (Age Less than 65 years)

Total Income	Tax
Upto 1,45,000	NIL
1,45,000 to 1,50,000	10% amount exceeding Rs. 1,45,000
1,50,000 to 2,50,000	Rs. 500 + 20% amount exceeding Rs. 1,50,000
Exceeding Rs. 2,50,000	Rs. 500 + Rs. 2000 + 30% of amount exceeding Rs. 2,50,000

Rate of Senior Citizens (age greater or equal to 65 years)

Total Income	Tax
Upto 1,85,000	NIL
1,85,000 to 2,50,000	20% amount exceeding Rs. 1,85,000
Above Rs. 2,50,000	Rs. 13000 + 30% amount exceeding Rs. 250,000

Note (1) if a person has total income more than 10,00,000 he has to pay 10% surcharge.

2.   Each individual has to pay 3% education cess on his total income tax.

Rebates in Income tax under section of income tax.

An individual is also allowed a rebate in income tax on account of savings in following instruments.

i)   General Provident Fund (GPF)
ii)   Public Provident Fund (PPF)
iii) Contributory Provident Fund (CPF)
iv)   Group Insurance plan (GIS)
v)   Life Insurance premium (LIC) including (ULIP)
vi)   Tuition fee of two children
vii) Postal life Insurance (PLF)
viii) Interest paid towards housing loan
ix)   National saving certificate (NSC) Etc.

3. PAN : Permanent Account Number

1.   A car was purchased for Rs. 2,80,000 and sold for Rs. 2,00,000 then loss %
     a) 27.57%   b) 29%
     c) 28.57%   d) 28%

2.   If the C.P of 6 articles is equal to the S.P of 4 articles then the gain percent.
     a) 50%   b) 100%
     c) 200%   d) 25%

3.   An toys dealer buys a toy for Rs. 425 and spend Rs. 15 on transporting it to his shop if he sells the toy for Rs. 550, then his profit percent is.
     a) 50%   b) 25%
     c) 75%   d) 20%

4.   If the C.P of 15 watches be equal to the S.P of watches then the loss percent is
     a) 50%   b) 20%
     c) 25%   d) 40%

5.   A price of a bike is Rs. 45000. It is sold at 42300 after allowing certain discount. Then rate of discount is.
     a) 8   b) 7
     c) 6   d) 9

6. Find the single discount equivalent to successive discount of Rs. 15% and 20%
   a) 30 %　　　　b) 28%
   c) 32%　　　　d) 35%

7. The single discount equivalent to a discount series 10% 20% , 40%
   a) 20%　　　　b) 30%
   c) 40%　　　　d) 10%

8. If the list price of product is Rs. 500 and discount series 15%, 5% then S.P is
   a) Rs. 403.75　　b) Rs. 403.00
   c) Rs. 403.25　　d) Rs. 403.50

9. The list price of a briefcase is Rs. 600 the rate of discount is 5% then the amount to be paid by the customer for the briefcase is
   a) Rs. 550　　　b) Rs. 595
   c) Rs. 570　　　d) Rs. 1498

10. A laptop is available for Rs. 23525 after discounting @ 9% then its list price is
    a) Rs. 25642.25　b) Rs. 25642.75
    c) Rs. 25642.50　d) Rs. 25642.00

11. C.I on Rs. 2800 for 1 ½ years at 10% per annum, interest compound half yearly
    a) Rs. 440.35　　b) Rs. 442.35
    c) Rs. 440.50　　d) Rs. 441.35

12. C.I on Rs. 2400 compound annually for 2 years 6 months at the rate of 5% per annum.
    a) Rs. 312.50　　b) Rs. 312.25
    c) Rs. 312.00　　d) Rs. 312.75

13. A calculator is available for Rs. 750 cash or Rs. 200 C.D.P along with 6 monthly installments of Rs. 100 each. Then the rate of interest charged under the installment plan is
    a) $31\frac{1}{3}$ % pa　　　b) $33\frac{1}{2}$ % pa

    c) $33\frac{1}{3}$ % pa　　d) 33% pa

14. A person bowered Rs. 33100 from the bank and promised to return the amount in three equal annual installments. If the rate of interest is 10% p.a correspond annually then amount of the installment is.
    a) Rs. 13000　　b) Rs. 13110
    c) Rs. 13410　　d) Rs. 13310

15. A bicycle is sold for Rs. 2700 cash or for Rs. 900 C.D.P alongwith two monthly installments of Rs. 915 each. Then the rate of interest charged under the installment scheme is
    a) 13.41 % p.a　　b) 12.41% p.a
    c) 14.41 % p.a　　d) 11.41 % p.a

16. PAN stands for
    a) Permanent Account Number
    b) Permanent Address Number
    c) Pre Account Number
    d) None of these

17. Which of the following is not including in rebate under section 80C.
    a) National Saving Certificate
    b) Postal Life Insurance
    c) Group Insurance Plan
    d) Direct Investment in stock exchange.

18. HDFC stands for
    a) Human Development Finance Corporation
    b) Housing Develoment Finance Corporation
    c) Home development Finance Corporation
    d) None of these

19. NSC stands for
    a) National saving certificate
    b) National school council
    c) National student council
    d) National sports council

20. 2% education cess is paid on
    a) Total Income
    b) Total Savings
    c) Total Tax payable
    d) LIC premium

21. Find Income Tax, Mr. Gupta has to pay during the year
    Total Income   Rs. 5,40,000
    P.F   Rs. 5000 P.M
    LIC   Rs. 5000 Quarterly
    N.S.C   Rs. 20,000
    a) Rs. 1,12,000   b) Rs. 1,20,000
    c) Rs. 1,00,000   c) Rs. 1,10,000

22. Find the single discount equivalent to discounts of 5% & 10%
    a) 14.5%   b) 16%
    c) 15%   d) 20%

23. IFFCO stands for
    a) Indian Farmer Furtilizer Co-operative
    b) Indian Former Furtilizer Co-operative
    c) Indian Farmer Furtilizer Coperation
    d) None of these

24. Total Income of Mrs. Asha is Rs. 264000. During year she donates Rs. 4000 towards CM's state relief fund. She contributes Rs. 3600 per year in her GPF and deposits Rs. 25000 in PPF. Then Income tax to be paid by her is
    a) 11526   b) 11500
    c) 11626   d) 11600

25. Raj Rani get Rs. 1,80,000 as salary this year. If she deposit Rs. 12000 in provident fund then her income tax is
    a) Rs. 3600   b) Rs. 4100
    c) Rs. 4400   d) Rs. 4000

26. What is the present value of Rs. 5000 due 5 years hence if the rate of interest is 6% per annum compound half yearly (Given $(1.03)^{-10}$ = 0·7441)
    a) Rs. 3720.50   b) Rs. 3600
    c) Rs. 3800   d) Rs. 4000

27. Raj Rani is a pensioner getting a pension of Rs. 9000 per month. Calcualte the income tax paid by her, when she does nto make any saving
    a) Rs. 4200   b) Rs. 4400
    c) Rs. 4600   d) Rs. 4800

28. A senior citizen's annual pension is Rs. 141600. Calculate wheather he is required to pay any income tax. If yes howmuch tax will he have to pay ?
    a) Rs. 2400   b) Rs. 1800
    c) Rs. 200   d) No tax

29. A person deposits in a bank Rs. 10,000 after every six months. If the interest is 10% per annum per annum compound half yearly, What would be the sum standing to his credit at the end of 2 years ? (Given $(1.05)^4$ = 1.2155)
    a) Rs. 43100   b) Rs. 42100
    c) Rs. 45000   d) Rs. 46000

30. Amount on Rs. 2500 compoundded annually for 2 years at the rate of 5% per half year is
    a) Rs. 3045   b) Rs. 3035
    c) Rs. 3025
    d) Can't be determined

COMMERCIAL MATHEMATICS

1	c	2	a	3	b	4	c
5	d	6	c	7	d	8	a
9	c	10	a	11	d	12	a
13	c	14	d	15	a	16	a
17	d	18	b	19	a	20	c
21	a	22	a	23	a	24	a
25	b	26	a	27	c	28	d
29	a	30	c				

ARITHMETIC PROGESSION

Points to Remember

i) **Arithmetic Progression (AP) :**

A sequence a_1, a_2, a_3, ... a_n .... is called an arithmetic progression, if there exists a constant number d such that

$a_2 = a_1 + d$
$a_3 = a_2 + d$
$a_4 = a_3 + d$
....
....
....
$a_n = a_{n-1} + d$ & so on.

The constant "d" is called common difference of the A.P. Thus if the first term is "a" andthe common difference is "d", then a, a + d, a + 2d, a + 3d, ... is an arithmetic progression.

ii) **General Term of an A.P**

$a_n = a + (n-1) d$
or l = a+(n-1) d where l is last term.

iii. **Sum to n terms of an A.P**

$S_n = \dfrac{n}{2}(a + l)$

or $S_n = \dfrac{n}{2}[2a + (n-1)d]$

iv) The sum of first n positive integer is given by

$S_n = \dfrac{n(n+1)}{2}$

v) Arithmetic mean between two nos. a and b is

$A = \dfrac{a+b}{2}$

1. Which of the following sequences is A.P sequence.
    a) 2, 5, 8, 11, ...   b) 3, 9, 27, 81, ...
    c) 1, 2, 4, 9, ...   d) 2, 4, 16 ....

2. Series whose nth term is 1 – 2n
    a) 1, 3, 5, 7, ...
    b) 2, 4, 6, 8, ...
    c) –1, – 3, – 5, – 7, ...
    d) – 2, – 4, – 6, ...

3. Which of the following sequences is A.P sequence.
    a) $\dfrac{1}{2}, \dfrac{1}{4}, \dfrac{1}{6}, \dfrac{1}{8}$, ...
    b) $2^2, 3^2, 4^2, 5^2$, ...
    c) 0, – 3, – 6, – 9, ...
    d) a, a + 1, a + 3, a + 6, ...

4. Find the series whose nth term is 3 – 5n
    a) – 2, – 7, – 12, – 17, ...
    b) 2, 4, 6, 8, ...
    c) $2^2, 3^2, 4^2$, ...
    d) 2, 4, 16, ...

5. If the 7th term of an A. P. is 34 and 13th term is 64, then find the 18th term of A.P.
    a) 87   b) 88
    c) 89   d) 90

6. 54th term of A.P 3, 15, 27, 39 …… is
    a) 739   b) 630
    c) 639   d) 636

7. 21st Term of A.P 11,8,5,2………is
    a) 49   b) -49
    c) 59   d) -59

8. Is 124 a term of the A.P 4,9,14,19…….?
   a) 24th b) 25th
   c) 23rd d) 26th

9. Find n^{th} term if first term on an AP is -7 and common differernce 5 find 18th term
   a) 68   b) 75
   c) 78   d) 79

10. If nth term of an A.P is (3n-2). Then its 7th term is
    a) 21   b) $3n+2$
    c) 19   d) 23

11. How many terms are there in the AP ?
    $$-1, \frac{-5}{6}, \frac{-2}{3}, \frac{-1}{2}, ..., \frac{+10}{3}$$
    a) 27   b) 28
    c) 30   d) 32

12. Which term of the sequence -3, -7, -11 ….. is -403?
    a) 100   b) 101
    c) 102   d) 103

13. The third term of the series of an A.P is 1/5 and 5th term is 1/3 then ist term is
    a) 1/15   b) 15
    c) -15   d) -1/15

14. If $k + 2$, $4k – 6$ and $3k – 2$ are the three consecutive terms of an A.P. then value of k is
    a) 1   b) 2
    c) 3   d) 4

15. The common difference of an A.P whose nth term is 5-6n is
    a) -4   b) -5
    c) -6   d) -7

16. Which term of the series 3+7+11+15……… is 47
    a) 12th b) No term
    c) 10th d) 7th

17. The sum of series $2 + 15 + 18 + 21…….. + $ 30 terms is
    a) 1470   b) 147
    c) 1407   d) 1070

18. The sum of the sequence $– 8, - 6 , - 4……. + 40$ is
    a) 500   b) 400
    c) 600   d) None

19. How many terms of the series $– 12 – 9 – 6 – 3$ …. must be taken so that series sum is 54
    a) 11   b) 12
    c) 13   d) 10

20. The sum of m numbers of an A.P is $3m^2 + 4m$, its pth term is
    a) 6P+1   b) P + 1
    c) 4P+1   d) 6P

21. Find number of terms of the series
    $$3 + \frac{10}{3} + \frac{11}{3} + ... \text{ which amount to be 23}$$
    a) 4   b) 5
    c) 6   d) 7

22. S_n of an A.P $= n + 3n^2$, then its rth term is

    a) $6r + 1$ b) $6r – 1$
    c) $6r$ d) None of these

23. Sum of first n natural number is
    a) $\dfrac{n(n-1)}{2}$ b) $\dfrac{n(n+1)}{2}$
    c) $\dfrac{n(n+1)}{4}$ d) $\dfrac{n(n-1)}{4}$

24. How many terms of the AP 1, 4, 7, ... are needed to given sum 3725 ?
    a) 60   b) 45
    c) 50   d) 65

25. $1 + 6 + 11 + 16\ldots\ldots + x = 148$ then x =?
    a) 36   b) 63
    c) 35   d) 53

26. The sum of the series $\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{8} +$ to 9 terms is
    a) -5/3   b) -1/2
    c) 1   d) -3/2

27. Sum of all positive integers between 100 to 1000 which are divisible by 7 is
    a) 44955   b) 55944
    c) 54945   d) 45994

28. Find the common difference of the AP for which 20th term is 10 more than the 18th term.
    a) 6   b) 7
    c) 8   d) 5

29. Sum of all the numbers between 10 and 200 which are exactly divisible by 6
    a) 3360   b) 3260
    c) 3060   d) 3460

30. In boring a well 50 meters deep, the cost is Rs. 6/- for first meter and additional Rs. 1.50 for each subsequence meter. What is the boring 13th meter and also the cost of boring the entire well
    a) Rs. 2133.5   b) Rs. 2137.5
    c) Rs. 2331.5   d) Rs. 2136.5

31. A man saves Rs. 100 in the 1st year in each succeeding year, he saved Rs. 20 more than the previous year, how much has he saved at the end of 40 years.
    a) Rs. 17600   b) Rs. 19600
    c) Rs. 16000   d) Rs. 17000

32. The three numbers in A.P whose sum and product are 12 and 48 respectively.
    a) 2, 4, 6   b) 1, 3, 5
    c) 2, 6, 10   d) 3, 6, 9

33. Four numbers in A.P whose sum is 20 and sum of whose square is 120
    a) 1,3,5,7   b) 2,6,10,14
    c) 2,4,6,8   d) 3,5,7,9

34. The sum of three numbers in AP is -3 and product is 18. Find numbers
    a) 2,-1,-4   b) 1,2,4
    c) 2,4,1   d) 4,2,1

35. Sum of all two digit positive number between 10 and 100.
    a) 2075   b) 2475
    c) 2400   d) 2275

36. If 7 times the 7th term of an A.P is equal to 11 times the 11th term then 18th term of the A.P is
    a) 10   b) 20
    c) 0   d) None of these

37. The sum of odd numbers between 0 and 50 is
    a) 525   b) 650
    c) 575   d) 625

38. In an A.P the sum of 1st n^{th} term is $\dfrac{3n^2}{2} + \dfrac{5n}{2}$, find its 25th term
    a) 67   b) 76
    c) 64   d) 62

39. Number of three digit numbers between 100 and 1000 which are divisible by 7
    a) 128   b) 120
    c) 126   d) 124

40. Which term of the sequence 20, $19\dfrac{1}{4}$, $18\dfrac{1}{2}$, $17\dfrac{3}{4}$, ... is the first negative terms ?

a) 26th term   b) 30th term
c) 28th term   d) 29th term

41. Which term of the AP 3, 15, 27, 39, ... will be 132 more than its 54th term ?
    a) 66th term   b) 65th term
    c) 72th term   d) 76th term

42. How many three digit numbers are divisible by 7 ?
    a) 126   b) 122
    c) 1390   d) 128

43. If $2x, x + 10, 3x + 2$ are in A.P., then find the value of x.
    a) 6   b) 8
    c) 5   d) 0

44. If the sum of n terms of AP is $S_n = 3n^2 + 5n$, write its common difference
    a) 8   b) 7
    c) 6   d) 10

45. If a,b,c are in AP then arithmetic mean between a and b are
    a) a+b   b) (a+b)(a-b)
    c) $\dfrac{a+b}{2}$ d) $\dfrac{a-b}{2}$

46. Arithmetic mean of 8,10,12,14,16,.......is
    a) 12   b) 14
    c) 8   d) 10

47. Find the sum of 72+69+66+63+..........+33
    a) 734   b) 735
    c) 732   d) 736

48. 11th term from the last of A.P. 10,7,4,........., 62 is
    a) -32   b) -37
    c) 37   d) 32

49. If 10 times the 10th term of an A.P. is equal to 15 times the 15th term then 25th term of an **A.P.** is
    a) 10   b) 15
    c) 25   d) 0

50. If the sum of pth terms of an A.P. is q and sum of qth term is p then sum of $p+q^{th}$ term will be
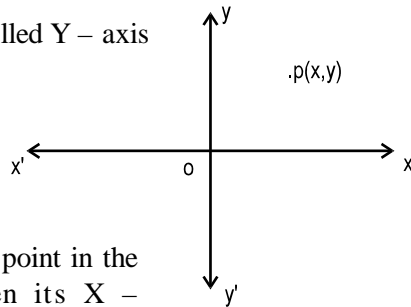   a) 0   b) p-q
    c) p+q   d) -(p+q)

AIRTHMATIC PROGRESSION

1	a	16	a	31	b	46	a
2	c	17	b	32	a	47	b
3	c	18	b	33	c	48	a
4	a	19	b	34	a	49	d
5	c	20	a	35	d	50	d
6	c	21	c	36	c		
7	b	22	b	37	d		
8	b	23	b	38	b		
9	c	24	c	39	a		
10	c	25	a	40	c		
11	a	26	d	41	b		
12	b	27	b	42	d		
13	d	28	d	43	a		
14	c	29	a	44	c		
15	c	30	b	45	b		

CO-ORDINATE GEOMETRY

Important facts and formulae:

XOX´ is called X – axis

YOY´ is called Y – axis

If P is any point in the plane, then its X – coordinate i.e. distance from X – axis is called abscissa and the Y – coordinate i.e. distance from Y – axis is called ordinate

Distance Formula : To find the distance between two points whose coordinates are given , say $p(x_1 , y_1)$ and $q(x_2 , y_2)$

$$|PQ| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

The distance of a point P (x,y) from the origin O (0,0)

$$= \sqrt{(x - 0)^2 + (y - 0)^2}$$

Section formula (Internal Division) :–

To find the coordinates of the points which divide internally, the straight line joining the (x_1, y_1) and (x_2, y_2) in the ratio m:n

Coordinates are

$$\left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2} , \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$$
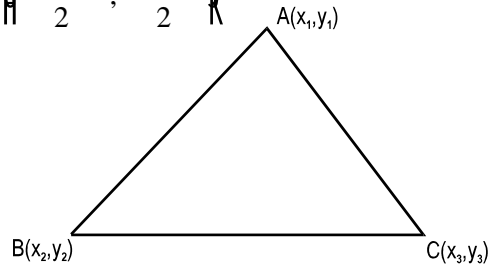
Coordinates of centroid of triangle :–

Let the vertices of a $\triangle$ ABC be A (x_1, y_1) , B$((x_2, y_2)$ and C (x_3, y_3) respectively coordinates of centroid of the triangle are

$$G \left(\frac{x_1 + x_2 + x_3}{3} , \frac{y_1 + y_2 + y_3}{3} \right)$$

Mid Point Formula:-Let D be the middle point of $P(x_1, y_1)$ and Q (x_2, y_2)

Then coordinates of D are

$$\left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$

Area of $\triangle$ ABC

$$= \frac{1}{2} [x_1 (y_2 - y_3) + x_2 (y_3 - y_1) + x_3 (y_1 - y_2)]$$

Three points (x_1, y_1), (x_2, y_2) and (x_3, y_3) are collinear when

$$\frac{1}{2} [x_1 (y_2 - y_3) + x_2 (y_3 - y_1) + x_3 (y_1 - y_2)] = 0$$

i.e. Area of $\triangle$ ABC = 0

Three points A (x_1, y_1), B (x_2, y_2) and C (x_3, y_3) are collinear or lie on a line if any one of the following takes place.

a) AB + BC = AC

b) AC + CB = AB

c) CA + AB = CB

d) Area of $\triangle$ ABC = 0

Four points will form

a) A parallelogram, if its opposite sides are equal.

b) A rectangle, if opposite sides are equal and two diagonals are also equal.

c) A rhombus , if all the four sides are equal and diagonals are perpendicular to each other.

d) A square, if all the sides are equal and diagonals are also equal.

Three points will form
i) An equilateral triangle, if all the three sides are equal.
ii) An isosceles triangle. If any two sides are equal.
iii) A right angled triangle, if the sum of the squares of any two sides is equal to the square of the third largest side.

Co-ordinate Geometry

Q1. Three points are collinear is
   a) Area of $\Delta = 0$
   b) Area of $\Delta < 0$
   c) Area of $\Delta > 0$
   d) None of these

2. Four points will form a parallelogram if
   a) Any two sides are equal
   b) All sides are equal
   c) Its opposite sides are equal
   d) None of these

3. Joining of three points will term a isosceles triangle if
   a) Any two sides are equal
   b) All sides are equal
   c) Its opposite sides are equal
   d) None of these

4. If $A(x_1, y_1)$, $B(x_2, y_2)$ $C(x_3, y_3)$ are vertices of Δ ABC then co-ordinates of centroid of triangle are.
   a) $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$
   b) $\left(\dfrac{x_1 + x_2 + x_3}{2}, \dfrac{y_1 + y_2 + y_3}{2} \right)$
   c) $\left(\dfrac{x_1 + x_2}{3}, \dfrac{y_1 + y_2}{3} \right)$

   d) $\left(\dfrac{x_1 + x_2 + x_3}{3}, \dfrac{y_1 + y_2 + y_3}{3} \right)$

5. Three points A (x_1, y_1), B (x_2, y_2) and C (x_3, y_3) are collinear if
   a) $AB + BC + AC = 0$
   b) $AB^2 + AC^2 = BC^2$
   c) $AB = AC$
   d) $AB + BC = AC$

6. Distance between the two points $(\cos\theta, \sin\theta)$ and $(\sin\theta, -\cos\theta)$ is
   a) $\sqrt{3}$ b) $\sqrt{2}$
   c) 2   d) 1

7. If end points of a diameter are (7,-5) and (-11,3) then radius of the circle is
   a) $\dfrac{\sqrt{392}}{2}$ b) $\dfrac{\sqrt{260}}{2}$

   c) $\dfrac{\sqrt{390}}{2}$ d) $\dfrac{\sqrt{1268}}{2}$

8. For what value of a these points (1, 2), (2, a) and (3, -2) are collinear
   a) 1   b) 2
   c) 3   d) 0

9. If the mid-point of the segment joining A $(x, y + 1)$ and B $(x + 1, y + 2)$ is c (3/2, 5/2), then find x, y.
   a) (1, –2)   b) (2, 2)
   c) (–1, –1)   d) (1, 1)

10. Let A (2,3) and B (–4,–9) be two points then mid point of AB is
   a) (-1, -3)   b) (1, 3)
   c) (-1, 3)   d) (1,-3)

11. For what value of K these three points (k,3) (5,1) and (1,9) are collinear.
   a) 3   b) 5
   c) 4   d) 1

12. If the distance between the points (3,0) and (0,y) is 5, what are the value of y ?
    a) ± 4
    b) 4
    c) -4
    d) 0

13. If point (a, 0) , (0, b) and (1, 1) are collinear, then what will be value of $\dfrac{1}{a} + \dfrac{1}{b}$?
    a) 1
    b) 2
    c) 0
    d) –1

14. Co-ordinates of the points, which divides the join of (2,3) and (14,7) in the ratio 3:2
    a) $\left(\dfrac{18}{5}, \dfrac{27}{5}\right)$
    b) $\left(\dfrac{23}{5}, \dfrac{16}{5}\right)$
    c) $\left(\dfrac{17}{5}, \dfrac{23}{5}\right)$
    d) $\left(\dfrac{16}{5}, \dfrac{27}{5}\right)$

15. If A (-3 , 2) , B (P,q) and C (-1, 4) are the vertices of an isosceles triangle and AB = BC then
    a) p+q = 1
    b) p-q = 1
    c) p + q=0
    d) P+q = -1

16. What will be centroid of the triangle, whose vertices are given as (4, -8) (-9, 7) and (8, 13)
    a) (2, 4)
    b) (1, 4)
    c) (4, 4)
    d) (4,2)

17. The distance between the points A(10cosθ, 0) and B(0, 10 sinθ)
    a) 10
    b) 6
    c) 1
    d) 9

18. If two vertices of triangle are (-3,1) and (10,2) and centroid is at origin then third vertex is
    a) (2, 3)
    b) (2, 1)
    c) (3, 1)
    d) (4, 1)

19. If the point (a, 0) is equidistant from (3 , 4) and (-2, -3) then value of a is
    a) 5
    b) 4
    c) 3
    d) 6

20. The point on y-axis which is equidistant from (4 , 0) and (4, 12) is
    a) (0 4)
    b) (0, 6)
    c) (10, -6)
    d) (10, -4)

21. The point on x – axis which is equidistant from (3,4) and (2, -3) is
    a) (4 , 0)
    b) (6, 0)
    c) (-6, 0)
    d) (-4,0)

22. The length of line segment AB is 14. if point A is (3, -4) & B is (-6, K) then value of K is
    a) 8
    b) 10
    c) 6
    d) – 8

23. The distance between points p(2,-3)and q(x,5) is 10 unit then value of x =
    a) 8,4
    b) 8,-4
    c) 2,4
    d) 3,4

24. In what ratio the x-axis divide the line segment joining the points (6 ,4) and (1, -7)
    a) 4 : 3
    b) 1 : 2
    c) 7: 4
    d) 7:2

25. If the centroid of the triangle formed by (7, x), (y, –6) and (9, 10) is at (6, 3) ; then (x, y) is :
    a) (4, 5)
    b) (5, 4)
    c) (–5, 2)
    d) (5, 4)

26. If A(2,2),B(-4,-4) and C(5,-8) are the vertices of a triangle then the length of the medien through vertex C is
    a) $\sqrt{65}$
    b) $\sqrt{117}$
    c) $\sqrt{85}$
    d) $\sqrt{113}$

27. If two vertices of a triangle are (3, -5) and (-7,4) and co-ordinates of the centroid of a triangle are (2,-1) then co-ordinates of third vertex.
    a) (10,2) b) (-10, 2)
    c) (10, -2) d) (-10, -2)

28. The end points of the diameter of a circle are (2, -1) and (5 , 4) then the co-ordinates of its centre

    a) $\left(\frac{5}{2}, \frac{3}{2}\right)$ b) $\left(\frac{-7}{2}, \frac{-3}{2}\right)$

    c) $\left(\frac{-7}{2}, \frac{3}{2}\right)$ d) $\left(\frac{7}{2}, \frac{3}{2}\right)$

29. One end of diameter is (1,2) if the centre of circle is (3,4) then other end of diameter is
    a) (-5 , -6) b) (-5, 6)
    c) (5 , 6) d) (5, -6)

30. For what value of P the points (-1, 3) , (2, P) and (5, -1) are collinear
    a) p = 1 b) p = 2
    c) p = -1 d) p = -2

31. X , Y and Z are seated at A (3, 1) , B(6,K) and C (8,6) if they are seated in line then value of K will be
    a) 2 b) 3
    c) 5 d) 4

32. The area of the triangle formed by the points (a,b+c),(b,c+a) and (c,a+b) is
    a) a+b+c b) abc
    c) $(a+b+c)^2$ d) 0

33. If the area of the triangle formed by the points (x, 2x),(-2, 6) and (3,1) is 5 square units then x is equal to

    a) $\frac{2}{3}$ b) $\frac{3}{5}$

    c) 3 d) 5

34.. The ratio in which line segment joining the points (-3, 10) & (6 , -8) is divided by (-1, 6)
    a) 7 : 2 b) 2 : 7
    c) – 2 : 7 d) 2: - 7

35. A point P (2, -1) is equidistant from the points A (a_1, 7) and B (-3, 9) then value of a is
    a) 5 b) -5
    c) 7 d) -7

36. Three points P (3,3) , Q (9,0) and R (12,21) are the vertices of a
    a) Isosceles triangle
    b) Equilateral triangle
    c) Right angled triangle
    d) None of these

37. If A(1,2), B(4,3), C(6,6) are the three vertices of a parallogram ABCD. Find the cordinate of 4th vertex D
    a) (3,1) b) (3,6)
    c) (6,3) d) (1,3)

38. If p(2,6) is the mid point of the line segment joining A(6,5), B(4,5) then y=
    a) 6 b) 7
    c) 8 d) 9

39. The value of K, if the point A (0,2) is equidistant from (3,m) and (m, 3)
    a) 2 b) 3
    c) 4 d) 5

40. Three points (2a, 4a) , (2a, 6a) and $(2a + \sqrt{3a}, 5a)$ are vertices of
    a) An equilateral triangle
    b) Isosceles triangle
    c) Right angled triangle
    d) None of these

41. The area of the triangle , whose vertices are (2, 3), (-1, 0), (2, -4)
    a) $\frac{11}{2}$ sq units
    b) $\frac{12}{2}$ sq units
    c) $\frac{21}{2}$ sq units
    d) $\frac{23}{2}$ sq units

42. If the centroid of the triangle formed by the points (a, b), (b, c) and (c, a) is at the origin, then $a^3+b^3+c^3$ is equal to
    a) abc
    b) 0
    c) a+b+c
    d) 3abc

43. The four points (0,0), (0, 5), (6, 5)and (6, 0) represents
    a) a rhombus
    b) a square
    c) rectangle
    d) Parallelogram

44. If the points (k,3)(6,-2)(-3,4) are collinear then k =
    a) $-\frac{1}{2}$
    b) $\frac{1}{2}$
    c) $-\frac{3}{2}$
    d) $\frac{3}{2}$

45. If the distance between the points A (4, p) & B (1, 0) is 5 units, then the value of p is
    a) ± 4
    b) 4
    c) –4
    d) 0

46. Find the co-ordinates of the points which divides the line segment joining A (-1,3) and B (4,-7) in the ratio 3:4 points are
    a) $\left(\frac{8}{7},-\frac{9}{7}\right)$ and $(-16,33)$
    b) $\left(-\frac{8}{7},-\frac{9}{8}\right)$ and $(16,33)$
    c) $\left(\frac{8}{7},\frac{9}{8}\right)$ and $(16,32)$
    d) $\left(\frac{8}{7},16\right)$ and $(32,33)$

47. Find the ratio inwhich y-axis divides the line segment joining A (–3, –4) and B (1, –2).
    a) 1 : 3
    b) 2 : 3
    c) 3 : 1
    d) 2 : 3

48. If two vertices of a triangle are (-3,1) and (0,-2) and centroid is at the origine, then find 3rd vertex.
    a) (1,3)
    b) (3,2)
    c) (3,1)
    d) (2,1)

49. The area of triangle formed by A(0,1) B(0,5), C(3,4) is
    a) 16 sq.unit
    b) 8 sq.unit
    c) 4 sq.unit
    d) 6 sq.unit

50. Find the relation between x and y such that point (x,y) is equally distance from the point (3,6)(-3,4) the relation is
    a) 2x+3y=4
    b) 3x+y=5
    c) 4x+5y=3
    d) 5x+3y=5

CO-ORDINATE GEOMETRY

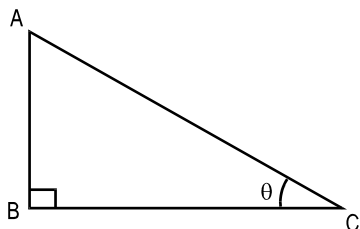| 1	a	11	c	21	b	31	d	41	c
2	c	12	b	22	a	32	d	42	d
3	c	13	a	23	b	33	a	43	c
4	b	14	d	24	c	34	b	44	c
5	d	15	a	25	d	35	c	45	a
6	b	16	b	26	c	36	c	46	a
7	a	17	a	27	c	37	b	47	c
8	d	18	c	28	d	38	b	48	c
9	d	19	d	29	c	39	b	49	d
10	a	20	b	30	a	40	a	50	b

TRIGONOMETRY

1. In a right angled triangle Δ ABC , let ABC = 90° and angle ACB = θ perpendicular AB = p, hypotenuse AC = h and Base BC = b

$$\sin \theta = \frac{\text{perpendicular}}{\text{Hypotenuse}} = \frac{p}{h}$$

$$\cos \theta = \frac{\text{base}}{\text{Hypotenuse}} = \frac{b}{h}$$

$$\tan \theta = \frac{\text{perpendicular}}{\text{base}} = \frac{p}{b}$$

Also

$$\mathrm{cosec}\,\theta = \frac{1}{\sin \theta}, \quad \sec\theta = \frac{1}{\cos \theta}, \quad \cot\theta = \frac{1}{\tan \theta}$$

2. T ratios :-

T- ratios	0°	30°	45°	60°	90°
$\sin\theta$	0	1/2	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos\theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	1/2	0
$\tan\theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	∞

3. Fundamental Trigonometrical Identities:-
   a) $\sin^2\theta + \cos^2\theta = 1$
   b) $1 + \tan^2\theta = \sec^2\theta$
   c) $1 + \cot^2\theta = \mathrm{cosec}^2\theta$

4. Values of T – ratios
   i) Sin θ and cos θ cannot be numerically greater than 1
   i.e. $|\sin\theta| \leqslant 1$, $|\cos\theta| \leqslant 1$
   $-1 \leq \sin \theta \leq 1$ and $-1 \leq \cos \theta \leq 1$

   ii) sec θ and cosec θ cannot be numerically less than 1

   i.e. $|\sec\theta| \geqslant 1$, $| \mathrm{cosec}\theta | \geqslant |1$
   $\sec \theta \leq -1$ or $\sec \theta \geq 1$ and $\mathrm{cosec}\ \theta \leq -1$ or $\mathrm{cosec}\ \theta \geq +1$

   iii) tan θ and cot θ can have any value.

5. Relation between three system of measurement of an angle.
   a) To convert degrees into grades, multiply by 10/9 and to convert grades into degrees multiply by 9/10
   b) to convert degrees into radians, multiply by $\frac{\pi}{180}$ and to convert radians into degrees multiply by $\frac{180}{\pi}$
   c) To convert grades into radians, multiply by $\frac{\pi}{200}$ where π(pie) = $\frac{\text{circumference of circle}}{\text{diameter of circle}}$

   The value of $\pi = = \frac{22}{7}$ or 3.14159 nearly.

6. T- ratios of allied angles
   a) $\sin (-\theta) = -\sin\theta$, $\mathrm{cosec}\ (-\theta) = -\mathrm{cosec}\theta$
   $\cos (-\theta) = \cos\theta$, $\sec (-\theta) = \sec\theta$
   $\tan (-\theta) = -\tan\theta$, $\cot (-\theta) = -\cot\theta$
   b) $\cos (90° - \theta) = \sin\theta$, $\sec (90° - \theta) = \mathrm{cosec}\theta$
   $\tan (90° - \theta) = \cot\theta$, $\cot (90° - \theta) = \tan\theta$
   $\mathrm{cosec} (90° - \theta) = \sec\theta$, $\sin (90° - \theta) = \cos\theta$
   c) $\sin (90° + \theta) = \cos\theta$
   $\mathrm{cosec} (90° + \theta) = \sec\theta$
   $\cos (90° + \theta) = -\sin\theta$
   $\sec (90° + \theta) = -\mathrm{cosec}\theta$
   $\tan (90° + \theta) = -\cot\theta$
   $\cot (90° + \theta) = -\tan\theta$
   d) $\sin (180° + \theta) = -\sin\theta$
 $\sin (180° - \theta) = \sin\theta$
   $\cos (180° + \theta) = -\cos\theta$

cos (180° − θ) = − cosθ

tan (180° + θ) = + tanθ

tan (180° − θ) = − tanθ

e) sin (270° − θ) = − cos θ

cos (270° − θ) = − sin θ

tan (270° − θ) = + cot θ

sin (270° + θ) = − cos θ

cos (270° + θ) = + sin θ

tan (270° + θ) = − cot θ

sin (360° − θ) = − sin θ

cos (360° − θ) = + cos θ

tan (360° − θ) = − tan θ

sin (360° + θ) = + sin θ

cos (360° + θ) = + cos θ

tan (360° + θ) = + tan θ

Note : In Ist quadrant from 0° to 90° all T-ratios all +ve.

In IInd quadrant from 90° to 180° only sin θ and cosec θ all +ve all other T ratios are –ve.

In IIIrd quadrant from 180° to 270° tan θ and cot θ and positive all other T ratios are –ve.
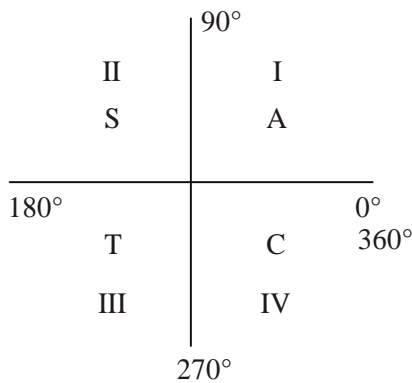
In fourth quadrant from 270° to 360° only cos θ and sec θ are +ve,are other T-ratios are -ve

All other T- ratios are –ve.

Angle of elevation : When an observer sees an object situated in upward direction, the angle formed by line of sight with horizontal line is called an angle of elevation.

Angle of depression : When an observer sees an object situated in downward direction, the angle formed by line of sight with horizontal line is called an angle of depression.

1. The value of $\dfrac{5\pi}{12}$ radians in degree is
   a) 54° b) 60°
   c) 75° d) 108°

2. The degree in a angle of measure $\dfrac{3\pi}{12}$ is
   a) 115° b) 120°
   c) 125° d) 135°

3. Express angle 90° into grades.
   a) 72ᵍ b) 80ᵍ
   c) 92ᵍ d) 100ᵍ

4. The value of $\cos^4 A - \sin^4 A$ is equal to
   a) 2cos²A +1 b) 2cos²A-1
   c) 2sin²A -1 d) 2sin²A+1

5. Angle 1050° lies in which quadrant.
   a) IV b) I
   c) II d) III

6. The angle of elevation of moon when the length of the shadow of a pole is equal to its height is
   a) 30° b) 45°
   c) 60° d) 90°

7. $(\sin θ + \cos θ)^2 + (\sin θ - \cos θ)^2$
   a) 1 b) 0
   c) 2 d) None of these

8. The value of $\sec^4 A - \sec^2 A$ is equal to
   a) $\tan^2 A - \tan^4 A$
   b) $\tan^4 A - \tan^2 A$
   c) $\tan^4 A + \tan^2 A$
   d) $\tan^2 A + \tan^4 A$

9. $\sqrt{\dfrac{1 - \cos\theta}{1 + \cos\theta}}$ is equal to
   a) $\operatorname{cosec}\theta + \cot\theta$
   b) $\operatorname{cosec}\theta - \cot\theta$
   c) $\operatorname{cosec}^2\theta + \cot^2\theta$
   d) $\operatorname{cosec}\theta \ \cot\theta$

10. The value of $\dfrac{\operatorname{cosec}\theta}{\cot\theta + \tan\theta}$ is
    a) $\sin\theta$ b) $\cos\theta$
    c) $\operatorname{cosec}\theta$ d) $\cot\theta$

11. Write the maximum value of $\sin\theta$:
    a) 1   b) -1
    c) 0   d) None of these

12. $\dfrac{1 + \cos\theta}{1 - \cos\theta}$ is equal to
    a) $(\operatorname{cosec}\theta + \cot\theta)^2$
    b) $(\operatorname{cosec}\theta - \cot\theta)^2$
    c) $\operatorname{cosec}\theta \ \cot\theta$ d) $\operatorname{cosec}^2 \cot^2\theta$

13. If $\tan x = 1$ and x lies in the third quadrant then $\sec\theta$ is equal to
    a) $-\sqrt{2}$ b) $\sqrt{2}$
    c) $-\dfrac{1}{\sqrt{2}}$ d) $\dfrac{\sqrt{3}}{2}$

14. If $\sin\theta$ is +ve & $\tan\theta$ is –ve then θ a will lie in which quadrant
    a) Ist quad   b) 3rd quad
    c) 2nd quad   d) 4th quad

15. The maximum value of $\sin x + \cos x$ is
    a) 1   b) 2
    c) $\sqrt{2}$ d) $\dfrac{1}{\sqrt{2}}$

16. If $\tan x = \dfrac{1}{\sqrt{3}}$ then $\sin x$ is equal to
    a) 2   b) $\dfrac{1}{2}$
    c) $\dfrac{-1}{2}$ d) $\dfrac{2}{\sqrt{3}}$

17. If $\sin\theta = \dfrac{12}{13}$, then what will be value of $\sec\theta$
    a) $\dfrac{5}{13}$ b) $\dfrac{13}{5}$
    c) $\dfrac{5}{12}$ d) None of these

18. If $A = 60°$, $B = 30°$ then $\sin(A-B)\sin(A+B) =$
    a) 1   b) -1
    c) $\dfrac{1}{2}$ d) $\dfrac{-1}{2}$

19. If $\cos 60° \cos 30° + \sin 60° \sin 30° = $?
    a) $\dfrac{\sqrt{3}}{2}$ b) $\dfrac{-\sqrt{3}}{2}$
    c) $\dfrac{-1}{\sqrt{3}}$ d) $\dfrac{-1}{2}$

20. The value of $\sin 150°$ is
    a) $\dfrac{1}{2}$ b) $\dfrac{\sqrt{3}}{2}$
    c) $-\dfrac{\sqrt{3}}{2}$ d) $\dfrac{-1}{2}$

21. The value of $\sin 120°$ is
    a) $\dfrac{1}{2}$ b) $\dfrac{\sqrt{3}}{2}$
    c) $-\dfrac{\sqrt{3}}{2}$ d) $\dfrac{-1}{2}$

22. The value of $\sin 270°$ is
    a) 0   b) 1
    c) -1 d) None of these

23. $\dfrac{\cos 135° - \cos 120°}{\cos 135° + \cos 120°}$ is equal to

    a) 3   b) − 3
    c) $3 + 2\sqrt{2}$ d) $3 - 2\sqrt{2}$

24. The value of Sin 30° is
    a) 1   b) − 1
    c) $\dfrac{1}{2}$ d) $\dfrac{1}{\sqrt{2}}$

25. Write the minimum value of sinθ :
    a) 1   b) -1
    c) 0   d) None of these

26. The value of cos² 10° + sin² 10° is
    a) 0   b) 1
    c) -1   d) 2

27. The value of $\sqrt{\cosec^2\theta - 1}$
    a) cot θ   b) Tan θ
    c) sin θ   d) cos θ

28. The value of Tan 45° + cot45° =
    a) 1   b) 3
    c) 4   d) 2

29. If tanθ = ¾, then value of
    $\dfrac{3\sin\theta - 4\cos\theta}{4\cos\theta - 3\sin\theta}$
    a) 0   b) 1
    c) -1   d) 2

30. If cosθ + cotθ = 5, then cotθ =
    a) $\dfrac{24}{5}$ b) $\dfrac{23}{5}$
    c) $\dfrac{14}{5}$ d) $\dfrac{12}{5}$

31. If 4 cotθ = 5   then value of
    $\dfrac{5\sin\theta - 3\cos\theta}{\sin\theta + 2\cos\theta}$

    a) $\dfrac{5}{14}$ b) $\dfrac{14}{5}$
    c) $\dfrac{24}{7}$ d) $\dfrac{7}{24}$

32. If cot A = $\dfrac{1}{\sqrt{3}}$, 0 < A < 90°, then the value
    of A is
    a) 45°   b) 30°
    c) 75°   d) 60°

33. If sinθ = $\dfrac{1}{2}$ then cosecθ
    a) $\sqrt{2}$ b) $\dfrac{1}{\sqrt{2}}$
    c) 2   d) − 2

34. If sinθ = $\dfrac{\sqrt{3}}{2}$ and 0 ≤ θ ≤ 90° then A =
    a) 0°   b) 30°
    c) 60°   d) 45°

35. If tanA = tan (90° - A) then A =
    a) 0°   b) 30°
    c) 60°   d) 45°

36. If tan²A + cot² A = 2 then tan⁴A + cot⁴ A=

    a) 1   b) 2
    c) 3   d) 4

37. The value of $\sqrt{\cosec^2 25° - \cot^2 25°}$ is
    a) 1   b) 2
    c) 3   d) 4

38. If tanθ = $\dfrac{4}{5}$, the value of $\dfrac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta}$ is
    a) 2/9   b) 1/9
    c) 1/3   d) None of these

39. For any angle θ, sec² θ - tan² θ is
    a) 1   b) − 1
    c) $\dfrac{1}{2}$ d) $\sqrt{3}$

40. The value of $\dfrac{1 - \tan^2 A}{1 + \tan^2 A}$ is
   a) 1   b) – 1
   c) $\sin^2 A - \cos^2 A$ d) $\cos^2 A - \sin^2 A$

41. The value of $\dfrac{1}{\sec^2 A} + \dfrac{1}{\csc^2 A}$ is
   a) 1   b) – 1
   c) $\sec^2 A - \csc^2 A$ d) 0

42. $(SinA + CosA)^2 + (SinA - CosA)^2$
   a) 1   b) 2
   c) 3   d) -1

43. The value of $\cos 20° + \sin 20°$ is
   a) +ve   b) -ve
   c) 0   d) Equal to one

44. The value of $\cot (90° - \theta) \csc (90° - \theta) \cos (90° - \theta)$ is
   a) $\tan \theta$ b) $\cot \theta$
   c) $\tan^2 \theta$ d) $\cot^2 \theta$

45. The value of $\dfrac{1}{\sec A - \tan A}$ is
   a) $\csc A + \cot A$
   b) $\sec A + \tan A$
   c) $\csc A - \cot A$
   d) $\sin A - Cos A$

46. The value of $\sin 54° - \cos 36°$ is
   a) 1   b) –1
   c) 0   d) 2

47. The value of $\csc^2 \theta - \cot^2 \theta + 2 \tan\theta \, Cot \theta$
   a) 1   b) 2
   c) 4   d) 3

48. Value of $2 (\sec^2 \theta - \tan^2 \theta) + \sin \theta \csc \theta$ is
   a) 1   b) 2
   c) 4   d) 3

49. Value of $3 (\sin^2 \theta + \cos^2 \theta) - 2\cos\theta \sec \theta$
   a) 1   b) 0
   c) 2   d) 5

50. The value of $Sin 75° - \cos 15°$
   a) 1   b) -1
   c) 0   d) 1/2

51. If $A+B=90°$ and $Cos\ B = 3/5$ the value of $\sin A =$
   a) 4/5   b) 3/5
   c) 5/3   d) None of these

52. If $9 \sin A = 34 \cos A$, then $\cot (90° - A) =$
   a) $\dfrac{9}{34}$ b) $\dfrac{34}{9}$
   c) $\dfrac{9}{35}$ d) $\dfrac{35}{9}$

53. If $16\cot x = 12$ then $\dfrac{\sin x - \cos x}{\sin x + \cos x} =$
   a) 1/7   b) 3/7
   c) 2/7   d) 0

54. The value of $(3 \cos^2 60° + 2 \cot^2 30° - 5 \sin^2 45°) =$
   a) 1   b) 2
   c) $\dfrac{13}{6}$ d) $\dfrac{17}{4}$

55. If $X \sin(90-\theta) Cot(90-\theta) = \cos(90-\theta)$ then $X =$
   a) 0   b) 1
   c) -1   d) 2

56. If $\tan X = 3 \cot X$ then $X =$
   a) 45°   b) 30°
   c) 60°   d) 15°

57. If $\sin (x - y) = \dfrac{1}{2}$ and $\tan (x + y) = \sqrt{3}$ then $x =$
   a) 30°   b) 45°
   c) 60°   d) 15°

58. $\cos^2 17° - \sin^2 73° =$
    a) 1
    b) 1/3
    c) 0
    d) -1

59. If $\cos \theta = \dfrac{8}{17}$ then $\sec \theta =$
    a) $\dfrac{9}{17}$
    b) $\dfrac{17}{8}$
    c) $\dfrac{17}{9}$
    d) $\dfrac{-8}{17}$

60. The value of $\dfrac{\tan 45°}{\sin 30° + \cos 30°} =$
    a) $1 - \sqrt{3}$
    b) $\sqrt{3} - 1$
    c) $\sqrt{3} + 1$
    d) $\sqrt{3}$

61. If $\tan\theta = 3/4$ then $\cos^2\theta - \sin^2\theta =$
    a) 7/25
    b) 1
    c) -7/25
    d) 4/25

62. If $\sin \theta + \sin^2 \theta = 1$, then the value of $\cos^2\theta + \cos^4 \theta$ is
    a) -1
    b) 1
    c) 0
    d) none of these

63. If $\sin (A+B) = 1$ and $\cos (A-B) = \dfrac{\sqrt{3}}{2}$ where A and B are acute angles then A =
    a) 45°
    b) 30°
    c) 90°
    d) 60°

64. A vertical pole is 330 m high. The angle subtended by pole at a point $330\sqrt{3}m$ m away from its foot is
    a) 30°
    b) 45°
    c) 60°
    d) 90°

65. In $\triangle$ ABC , $\angle A = 30°$, $\angle B = 90°$ and AB = 5. then BC =
    a) $\dfrac{5}{3}$
    b) $5\sqrt{3}$
    c) $\dfrac{5}{\sqrt{3}}$
    d) $\dfrac{3}{5}$

66. The length of the shadow of a telephone pole is equal to the length of the pole. Then the angle of elevation of the source of light is
    a) 30°
    b) 45°
    c) 60°
    d) 90°

67. The value of tan10°tan15°tan75°tan80° is
    a) -1
    b) 0
    c) 1
    d) None of these

68. In a $\triangle$ ABC, right angled at B, $\angle C = 45°$ AB = 5cm then BC=
    a) $\dfrac{1}{5}$ cm
    b) 4 cm
    c) $\dfrac{4}{15}$ cm
    d) $\dfrac{-4}{15}$

69. If a $\triangle$ PMO , right angled at M, given PM = 3 cm, OP = 6cm then $\angle P=$
    a) 30°
    b) 45°
    c) 60°
    d) 90°

70. The attitude AD of a $\triangle$ ABC in which $\angle A$ is obtuse is 10cm. if BD = 10cm and CD = 10√3cm then "A=
    a) 60°
    b) 45°
    c) 105°
    d) 150°

71. $\dfrac{1 - \tan^2 45°}{1 + \tan^2 45°} =$
    a) tan90°
    b) 1
    c) sin45°
    d) sin0

72. When the sun is 30° above the horizontal then length of shadow cast by a building 50m high is:
    a) $\dfrac{50}{\sqrt{3}}$ m
    b) $50\sqrt{3}$ m
    c) 25m
    d) $25\sqrt{3}$ m

73. The ratio of the length of a road and its shadow is $1: \sqrt{3}$. then the angle of elevation of the sun is :
    a) 30°
    b) 45°
    c) 60°
    d) 90°

74. The length of shadow of a pole on a level ground is 3 times the length of the pole , the angle of elevation of the sun is.
a) 30° b) 45°
c) 60° d) 90°

75. If $2\sin 3A = \sqrt{3}$ and $0 < A < 90°$ then $A =$
a) 10° b) 30°
c) 45° d) 20°

76. If $\tan A = \sin 45° \cos 45° + \sin 30°$ then $A =$
a) 30° b) 45°
c) 60° d) 90°

77. The value of $\dfrac{1 + \tan^2 A}{1 + \cot^2 A}$ is equal to
a) $\sec^2 A$ b) -1
c) $\cot^2 A$ d) $\tan^2 A$

78. If $\tan (A-B) = \dfrac{1}{\sqrt{3}}$ and $\tan (A+B) = \sqrt{3}$ then $\angle B$ is
a) 30° b) 45°
c) 60° d) 15°

79. Find the value of $\csc 30° + \cot 45°$
a) 1 b) 2
c) 3 d) 4

80. If $\cos (40° + X) = \sin 30°$, then $X =$
a) 70° b) 10°
c) 20° d) 40°

81. The value of $\sin 60° \sec^2 45° - 3\tan 40°$ equal to
a) 1 b) 0
c) -1 d) -2

82. What will be minimum value of $\cos \theta$ in Ist quandrant.
a) 1 b) –1
c) 0 d) 2

83. The value of $\sin^2 29° + \sin^2 61°$ is
a) 1 b) 0
c) $2\sin^2 29°$ d) $2\cos^2 61°$

84. If $\tan A = \cot B$, then what will be value of $A + B$
a) 0° b) 30°
c) 90° d) 60°

85. What will be value of $\csc 30° + \cot 45°$
a) 10 b) 6
c) 9 d) 3

Trigonometry

1	c	16	b	31	b	46	c	61	a	76	b
2	d	17	b	32	d	47	d	62	b	77	d
3	d	18	c	33	c	48	a	63	d	78	d
4	b	19	a	34	c	49	a	64	a	79	c
5	a	20	c	35	d	50	c	65	c	80	c
6	b	21	d	36	b	51	b	66	c	81	b
7	c	22	c	37	a	52	b	67	c	82	c
8	c	23	d	38	b	53	a	68	d	83	a
9	b	24	c	39	a	54	d	69	c	84	c
10	b	25	b	40	d	55	b	70	c	85	d
11	a	26	b	41	a	56	c	71	b		
12	d	27	a	42	b	57	b	72	b		
13	a	28	d	43	a	58	c	73	a		
14	c	29	c	44	c	59	b	74	a		
15	c	30	d	45	b	60	b	75	d		

MENSUREATION OF PLANE FIGURES

IMPORTANT FACTS & FORMULAS

a) Area of Triangle $= \frac{1}{2} \times (\text{side}) \times$
(corresponding altitude)
$= \frac{1}{2} \times \text{base} \times \text{attitude}$

Heron's formula
The area of a Δ ABC, in which
AB $= c$, BC $= a$ and AC $= b$ is given by
$= \sqrt{S(S-a)(S-b)(S-c)}$

where $S = \frac{a+b+c}{2}$

Perimeter of a triangle $= a + b + c =$ sum of length of all sides

In case of right angle triangle
Perimeter $= a + b + \sqrt{a^2 + b^2}$

where hypotenuse $= \sqrt{a^2 + b^2}$

Isosceles triangle $= 2a + d$ where $d = a\sqrt{2}$
equilateral triangle $= 3a$
Area of equilateral triangle $= \frac{1}{2} ah$

Where h $= \left(\frac{\sqrt{3}}{2}\right) a$ (altitude).

b) Perimeter of ractancle $= 2(a+b)$
Area of rectangle $= ab$
    $a =$ length , $b =$ breadth

c) Area of square $= (\text{side})^2 = a^2$
    Perimeter of square $= 4a$

d) Area of Parallelogram $= ah$
    $a =$ side, $b =$ side
    h = distance between parallel sides
    Perimeter of parallelogram $= 2(a + b)$

e) Area of Rhombus $= \frac{1}{2}$ product of diagonals
    Perimeter $= 4a$ where $a =$ side

f) Area of trapezium $= \frac{1}{2}$ (sum of parallel sides) x h
    where h = distance between parallel sides

MENSUEATION OF SOLID FIGURES.

a) Cuboid

(i) Lateral / Curved surface area of cuboid
$= 2h(l+b)$ Where l : length, b: breadth , h: height
(ii) Total surface area $= 2(lb + bh + hl)$
(iii) Volume $= lbh$
(iv) Length of diagonal of cuboid
$= \sqrt{l^2 + b^2 + h^2}$

b) **Cube**

(i) Curued surface area of cube $= 4a^2$
    Where a : Side of cube
(ii) Total surface area of cube $= 6a^2$
(iii) Volume of cube $= (\text{side})^3 = a^3$
(iv) Length of diagonal of cube $= \sqrt{3}\, a$

Cylinder

c) (i) Curved surface area of right circular cylinder $= 2\pi rh$
(ii) Volume of right circular cylinder $= \pi r^2 h$
    $r =$ radius , $h =$ height
(iii) Total surface area of right circular cylinder $= 2\pi rh + 2\pi r^2 = 2\pi r(r + h)$

Cone

d) (i) Curved surface area of right circular cone $= \pi rl$, $r =$ radius of a base , h : height , l : slant height
(ii) Total surface area of right circular cone $= \pi r(l+r)$
(iii) Volume $= \frac{1}{3}\pi r^2 h$

Sphere

e) Curved surface of sphere $= 4\pi r^2$
    Volume of sphere $= 4/3\ \pi r^3$

f) **Hemisphere**
    (i) Curved surface area of hemisphere $=$
        $2\pi r^2$, r : radius
    (ii) Total surface area of hemisphere $= 3\pi r^2$
    (iii) Volume of hemisphere $= \dfrac{2}{3}\pi r^3$

g) **Circle**
    (i) Area of circle $= \pi r^2$
        where $\pi = \dfrac{\text{circumference}}{\text{diameter}}$
        $\pi = 22/7$ (approx.)

h) **Semi-circle**
    Perimeter or circumference of circle $= 2\pi r$
    Area of semi circle $= \dfrac{1}{2}\pi r^2$
    Perimeter of semicircle $= \pi r$

i) **Sector**

    Area of sector of circle $= \dfrac{\pi r^2 \theta}{360°}$

    where θ is sector angle & r is radius of circle

j) **Arc of a circle**

    Length of minor arc of circle $= \dfrac{2\pi r\,\theta}{360°}$

    where θ is sector angle & r is radius of circle

k) **Segment of circle**

    Area of minor segment of circle $=$ Area   of sector OAXB $-$ Area of $\triangle$OAB

    Area of major segment $=$ Area of circle $-$ Area of minor segment
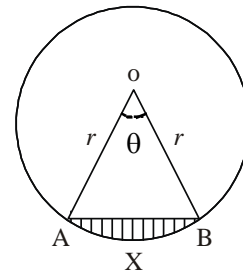
1. An underground water tank is in the form of a cuboid of edges 48m, 36m and 28m. then volume of the tank is.
    a) $48384\ m^3$ b) $58384\ m^3$
    c) $28384\ m^3$ d) $38384\ m^3$

2. The volume of a cube is $1728\ cm^3$. then its surface area is
    a) $564\ m^2$ b) $664\ m^2$
    c) $764\ cm^2$ d) $864\ m^2$

3. A cylinder of radius 12cm contains water to a depth of 20cm. a spherical iron ball is dropped into the cylinder and thus the level of water is raised by 6.75 cm. the radius of the ball is
    a) 7cm   b) 9cm
    c) 10cm d) 8cm

4. The volume of a cube is $1.728cm^3$. then the length of its edge is
    a) 100cm b) 8 cm
    c) 12cm   d) 14cm

5. The radius of the base and the height of a right circular cone are 7 cm and 24 cm respectively the volume of cone is
    a) $1032cm^3$ b) $1132\ cm^3$
    c) $1332cm^3$ d) $1232\ cm^3$

6. A right circular cone having radius of the base 7cm and height of 24 cm. then slant height of cone is
    a) 25cm b) 22cm
    c) 20cm d) 30cm

7. The diameter of the base of a right circular cylinder is 28cm and its height is 21cm then its curved surface area.

a) 1448cm²
b) 11648 cm²
c) 1848cm²
d) 1248 cm²

8. If the side of a square is increased by 50% , the percentage increased in area is:
a) 75%
b) 100%
c) 125%
d) 150%

9. The diagonal of a cube is $27\sqrt{3}$ cm. then its volume is
a) 19583cm³
b) 19483 cm³
c) 19683cm³
d) 19783 cm³

10. A toy is in the form of a cylinder mounted on a hemisphere of radius 3.5cm. if the total height of the toy is 15.5 cm. then its total surface area of the toy is
a) 214.5 cm²
b) 212.5 cm²
c) 210.5 cm²
d) 216.5 cm²

11. The diagonal of a cube is 9√3 cm. then its surface cube is
a) 480 cm²
b) 484 cm²
c) 400.5 cm²
d) 486 cm²

12. The perimeter of an equilateral triangle whose area is 4√3 cm² is
a) 8cm
b) 4cm
c) 12cm
d) 16cm

13. If an isosceles right triangle has area 200cm² then the length of its hypotenuse is
a) 10 cm
b) 40cm
c) 20cm
d) 20√2

14. The area of a triangle is 48 cm². its base is 12cm then its attitude is
a) 4 cm
b) 14 cm
c) 8cm
d) 16cm

15. If the area of an equilateral triangle is $81\sqrt{3}$ cm² then its height is
a) $9\sqrt{3}$ cm
b) $8\sqrt{3}$ cm
c) $7\sqrt{3}$ cm
d) $6\sqrt{3}$ cm

16. The volume of a sphere is 485100 cm. then its surface area is
a) 1486 cm²
b) 1386 cm²
c) 1286 cm²
d) 1186 cm²

17. Asphere and a cube have equal surface areas. What is theratio of the volume of the sphere to that of the cube ?
a) $\sqrt{\dfrac{9}{\pi}}$
b) $\sqrt{\dfrac{9}{\pi}}$
c) $\sqrt{\dfrac{3}{\pi}}$
d) None of these

18. The diagonal of a cube is $8\sqrt{3}$ cm. then its volume is
a) 512 cm³
b) 514 cm³
c) 510 cm³
d) 516 cm³

19. A cylinder of metal of radius 3 cm and height 8 cm is metal into cone of same radius. Then the height of the cone is.
a) 20cm
b) 22cm
c) 18cm
d) 24 cm

20. The area of a rectangular plot is 462 cm² and its length is 28m. then the perimeter of the plot is
a) 89 m
b) 88 m
c) 87 m
d) 86 m

21. The length of the altitude of an equilateral triangle of side 2x is
a) $\sqrt{3}x$
b) 3x
c) $3\sqrt{x}$
d) x

22. The base of an isosceles triangle is 80m and its area is 36 cm² then the perimeter of the triangle is
a) 162 cm
b) 160cm
c) 161 cm
d) 163 cm

23. The length of a rectangular hall is 5 cm more than its breadth of the area of the hall is 750 m² , then the perimeter of hall is

a) 100m   b) 105m
c) 110m   d) 115m

24. The perimeter of a rectangular plot is 75 m and its breadth is 16 cm. then the length of plot is
a) 20cm   b) 21 cm
c) 21.5 cm   d) 22cm

25. The area of square is 20 cm², then its side is
a) $5\sqrt{2}cm$ b) 5cm
c) $2\sqrt{5}cm$ d) None of these

26. The adjacent sides of a rectangles are 5 cm & 12 cm. Find the length of its diagonal & area of rectangle
a) 13 cm ; 60 cm²
b) 14 cm ; 56 cm²
c) 15 cm ; 45 cm²
d) 14 cm ; 60 cm²

27. The area of rectangle is 192 cm² and its perimeter is 5. Then the length of the rectangle is
a) 12 cm   b) 16 cm
c) 14 cm   d) 18 cm

28. The area of square is 282 cm² then its diagonal in cm in
a) $12\sqrt{2}$ b) 144
c) 24   d) 36

29. The area of the four walls of a room which is 7m long ,6.5 wide and 4 m high is
a) 100 m²   b) 102 m²
c) 104 m²   d) 108 m²

30. Find the perimeter of an equilateral triangle whose area is $4\sqrt{3}$ cm².
a) 8 cm   b) 10 cm
c) 19 cm   d) 12 cm

31. Find the area of a triangle whose sides are 13 cm, 14cm, 15cm.

a) 83cm²   b) 85cm²
c) 84cm²   d) 86cm²

32. The diagonals of a rhombus are 15 cm and 36 cm. then the perimeter of the rhombus is
a) 36cm   b) 39cm
c) 78cm   d) 72 cm

33. If the sides of rectangle are in the ratio 3 : 4 & its perimeter is 56 cm. Find its diagonal and area.
a) 30 cm ; 192 cm²
b) 20 cm ; 192 cm²
c) 40 cm ; 182 cm²
d) None of these

34. The area of rhombus whose diagonals are 15 cm and 36 cm is
a) 240 cm²   b) 250 cm²
c) 260 cm²   d) 270 cm²

35. The area of a square that can be inscribed in a circle of radius 10 cm is
a) 100 cm²   b) 150 cm²
c) 200 cm²   d) 400 cm²

36. The area of parallelogram whose side is 32 cm and the corresponding attitude is 6m is
a) 960 m²   b) 192 m²
c) 36 m²   d) 576 m²

37. The area of a parallelogram is 338 m² .If its altitude is twice the corresponding base, the base of the parallogram is
a) 13 cm   b) 26 cm
c) 10 cm   d) 12 cm

38. The area of trapezium whose parallel sides are 28 cm and 14 cm respectively and the distance between them is 5 cm is
a) 105 cm²   b) 110 cm²
c) 111 cm²   d) 102 cm²

39. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre , then the area of the sector is

a) 231 cm²   b) 232 cm²
c) 233 cm²   d) 243 cm²

40. The area of circle whose area and circumference are numerically equal, is
    a) 2π Sq.unit   b) 4π Sq.unit
    c) 6π Sq.unit   d) 8π Sq.unit

41. A bicycle wheel makes 5000 revolutions in moving 11 km then the radius of the wheel is
    a) 70 cm   b) 35 cm
    c) 60 cm   d) 30 cm

42. A 20 meter deep well with diameter 7 meter is dug and earth from digging is evenly spread out to form a plateform 22meter. Find the height of the plateform.
    a) 2.6m   b) 2.5m
    c) 2m   d) 3m

43. The sector is 56° cut from a circle has an area 4.4 cm² then the radius of the circle is
    a) 4 cm   b) 3 cm
    c) 5 cm   d) 6cm

44. A chord of a circle of radius 14 cm makes a right angle at the centre then the area of the minor segment of the circle is
    a) 56 m²   b) 65 m²
    c) 60 m²   d) 58 m²

45. The min hand of clock is 12 cm long. Then the area of the face of the clock described by the minute hand in 35 minutes is
    a) 260 cm²   b) 262 cm²
    c) 264 cm²   d) 266 cm²

46. The diagonal of the base of a cube is $7\sqrt{2}$ m. then the volume of the cube is
    a) 343 m³   b) $343\sqrt{3}$ m³
    c) $343\sqrt{3}$ m³   d) 686 m³

47. The difference between the circumference and the radius of a circle is 37 cm then the area of the circle is

a) 148 cm²   b) 150 cm²
c) 152 cm²   d) 154 cm²

48. Three metallic cubes of edges 1, 6, 8 cms are melted down and formed into a single cube without any wastage. Then the edge of the new formed cube has length
    a) 9 cm   b) 8 cm
    c) 7 cm   d) 6 cm

49. The area of a quadrant of a circle whose circumference is 22 cm is
    a) 9.5 cm   b) 9.4 cm
    c) 9.62 cm   d) 9.60 cm

50. The curved surface area of cylinder is 264m² and volume is 924m³ the ratio of its diameter to its height is
    a) 3:7   b) 7:3
    c) 6:7   d) 7:6

51. The diagonal of a cube is $4\sqrt{3}$ m. then the surface area of the cube is
    a) 90 m²   b) 92 m²
    c) 94 m²   d) 96 m²

52. The length of longest rod that can be placed in a box whose dimensions are 16cms, 15 cms and 12 cms is
    a) 25 cm   b) 24 cm
    c) 23cm   d) 22 cm

53. The perimeter of a sector of a circle of radius 5·2 cm is 16·4 cm. Find the area of the sector.
    a) 15·6 cm²   b) 18·6 cm²
    c) 14·9 cm²   d) 15 cm²

54. The edges of a rectangular solid are 20cms, 27cms and 50cms. Then the edge of a cube whose capacity is same as that of the given solid is
    a) 20cm   b) 30cm
    c) 40cm   d) 50cm

55. A solid metallic spherical ball of a diameter 6cm is melted and recast into a cone with diameter of a base as 12cm. The height of the cone is
    a) 2cm   b) 3cm
    c) 4cm   d) 6cm

56. The area traced in 50 revolutions of a roller, 2m wide and 1.4m diameter is:
    a) 220m²   b) 440m²
    c) 880m²   d) 1760m²

57. A right angled triangle with sides measuring 7 cms and 24 cms is made to turn about the smaller side. The volume of the cone thus formed is
    a) 4422 cm³   b) 4224 cm³
    c) 4242 cm³   d) 2244 cm³

58. If the area of an isocless triangle each of these sides is 10cm and base 12cm
    a) 48m²   b) 46m²
    c) 47m²   d) 49m²

59. A circus tent is of conical shape, whose base radius is 5m. if the height of the tent is 12m, the requirement of canvas is square more for such a tent is
    a) 930   b) 503·34
    c) $204\frac{2}{7}$ d) $180\frac{4}{7}$

60. The volume of a cylinder is 448π cm³ and height 7cm. then the curved surface area of cylinder is
    a) 325 cm²   b) 352 cm²
    c) 330 cm²   d) 523 cm²

61. A conical cover of dimension 24 cms in diameter and 16cms in height is required for a chimney. The amount of sheet metal required for cover is
    a) 200π cm²   b) 220π cm²
    c) 230π cm²   d) 240π cm²

62. The height and base radius of a cone are each increased by 100%. Then the volume of the cone becomes.
    a) Two times
    b) Four times
    c) Eight Times
    d) Sixteen Times

63. The curved surface area of a cone of 4070 cm² and its diameter is 70 cm then the slant height is
    a) 35 cm   b) 36 cm
    c) 37 cm   d) 38cm

64. The height of cone whose radius of base is 16 cms and whose volume is equal to the volume of a sphere of diameter 8 cms is
    a) 2 cm   b) 4 cm
    c) 1cm   d) 6cm

65. The diameter of two cones are equal if their slant height are in the ratio 5:4 then the ratio of their curved surface area is
    a) 5 : 4   b) 4:5
    c) 2:5   d) 5 :2

66. The number of spheres each having 6cm diameter that can be moulded from a solid cylinder whose height is 45 cms and diameter 4 cm is
    a) 5   b) 10
    c) 15   d) 20

67. The metallic cone of height 9cm is melted and turned into a sphere of diameter 18cm. the diameter of the base of the cone is
    a) 10cm   b) 36 cm
    c) 20 cm   d) 22cm

68. The edge of a cube whose volumes is the same as that of cylinder of radius 5.5 and the length 14 cms is
    a) 10cm   b) 11cm
    c) 20 cm   d) 22cm

69. The radius of a sphere whose volume and surface area have same value is
    a) 1 units   b) 2 units
    c) 3 units   d) 4 units

70. The minute hand of a clock is 15 cm long. Find the area swept by minute hand in 30 minutes
    a) $112 \cdot 5\pi$ cm^2 b) $115 \cdot 5\pi$ cm^2
    c) 110 cm^2 d) 102 cm^2

71. The hall of length 35 m required 8400 tiles of area 300 cm each to cover the entire floor. The breadth of the hall is
    a) 7 cm   b) 7.2 cm
    c) 7.4 cm   d) 7.1 cm

72. The largest sphere is carved out of a cube of a side 7cm. The volume of the sphere is
    a) 179.66cm^3 b) 180cm^3
    c) 178cm^3 d) 179cm^3

73. The volume of a cuboid is 560 cm^3 if its length and breadth are 20 cm and 7 cm respectively. Then its height is
    a) 4 cm   b) 8 cm
    c) 128 cm   d) 80cm

74. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is
    a) 60π cm^2 b) 68π cm^2
    c) 120π cm^2 d) 136π cm^2

75. If the surface area of a sphere is 616cm^2 Then its volume is
    a) 1437.33cm^3 b) 1431.33cm^3
    c) 1437.31cm^3 d) 1440.00cm^3

76. The volumes of two spheres are in the ratio 64 : 27. The ratio of their surface areas is
    a) 1 : 2   b) 2 : 3
    c) 9 : 16   d) 16 : 9

77. A solid piece of iron of dimensions (49 × 33 × 24) cm is moueded into a sphere. The radius of the sphere is
    a) 21 cm^2 b) 28 cm^2
    c) 35 cm^2
    d) None of these

78. A sphere is fitted tightly in a cylinder. What is the ratio of volume of a sphere and cylinder
    a) 2:3   b) 2:4
    c) 2:6   d) 2:8

MENSUREATION OF PLANE FIGURES

1	a	14	c	27	b	40	b	53	a	66	a
2	d	15	a	28	c	41	b	54	b	67	b
3	b	16	b	29	d	42	b	55	b	68	b
4	c	17	b	30	d	43	b	56	b	69	c
5	d	18	a	31	c	44	a	57	b	70	a
6	a	19	d	32	c	45	c	58	a	71	b
7	c	20	c	33	b	46	a	59	c	72	a
8	c	21	a	34	d	47	c	60	b	73	a
9	c	22	c	35	c	48	a	61	d	74	d
10	a	23	b	36	b	49	c	62	a	75	a
11	d	24	c	37	a	50	b	63	c	76	d
12	c	25	c	38	a	51	d	64	c	77	a
13	d	26	a	39	a	52	a	65	b	78	a

STATISTICS

IMPORTANT FACTS AND FORMULAS

1. Average : The mean of observation x_1, x_2, x_3….. x_n

$$\overline{X} = \frac{x_1 + x_2 + x_3 + \ldots\ldots + x_n}{n} = \frac{1}{n}\Sigma x$$

$$\overline{X} = \frac{\Sigma x}{n}$$

This method is suitable for ungrouped data only.

Note : a) Let $\overline{X}$ be the mean of n observation, if K is added to each observation, then the new mean $= \overline{X} + K$

b) If K is subtracted from each number
The new mean $\overline{X} - K$

c) If x is multiplied to each other. Then new mean $= K\overline{X}$

d) If each number is divided by K_1 then

New mean $\dfrac{\overline{X}}{K}$

Mean from grouped data

There are three methods in practice : it is to be noted that it is not sure that same average come out for same distribution, from each method

If n observation, occurring with frequencies f_1, f_2 —— f_n respectively

Then

$$\overline{X} = \frac{f_1 x_1 + f_2 x_2 + f_3 x_3 + \ldots\ldots + f_n x_n}{f_1 + f_2 + f_3 + \ldots\ldots + f_n}$$

$$= \frac{\Sigma fx}{\Sigma f} = \frac{\Sigma fx}{n}$$

$$\overline{X} = \frac{\Sigma fx}{N}$$

This is called "Direct Method"

Assumed mean deviation Method :- In this method the arbitrary mean 'a' is chosen which is called assumed mean, somewhere in the middle of all values of x.

If $\Sigma f_1 d_1 = f_1 (x_1 - a) + f_2 (x_2 - a) + \ldots\ldots + f_n (x_n - a)$

The mean $\overline{X} = a + \dfrac{1}{n}\Sigma f_1 x_1$

Shortcut method $\overline{X} = a + \dfrac{\lambda\Sigma f_1 x_1}{\Sigma f_1}$

Where a = assumed mean, λ = class interval (diff. of two consecutive values of x_1)

and $\quad n = \dfrac{x - a}{\lambda}$

This method is suitable , only when class sizeh, of all the class interval are same.

Median : if the value of x_1 in a same data are arranged in order of increasing or decreasing magnitude then the middle most value in this arrangement is called the median.

For an ungrouped data, the values of the variates, are arranged in order of magnitude. For finding the most value.

a) If n is odd, then the median will be the

$\left(\dfrac{n+1}{2}\right)$ th observation.

b) If n is even, the median will be the

arithmetic mean of $\left(\dfrac{n}{2}\right)^{th}$ and $\left(\dfrac{n+1}{2}\right)^{th}$

In case of grouped data median

observation $= L + \dfrac{\dfrac{N}{2} - C}{f} \times \lambda$

Where L = lower limit of the median class interval to which the median belongs.

C = Communicative frequency of the median class upto the lower limit of median class.

λ = width of class interval

f = Frequency of class interval to which median belongs.

Mode : Mode is that value , whose frequency is the maximum in a series. e.g. the mode of series 2,3,4,7,4,1,4,5 would be 4 since this value occurs more frequency (3 times) than any of others.

For a grouped distribution

$$\text{Mode} = l + \frac{f_0 - f_1}{2f_0 - f_1 - f_2} \times h$$

Where l is lower limit of the modal class

f_0 is frequency of modal class

h is width of the class interval.

f_1 is frequency of the class preceding the modal class.

f_2 is frequency of two class following the modal class.

Relationship among mean , median and mode

Mode = 3 median – 2 mean

Median = mode + $\frac{2}{3}$ (Mean – Mode)

Mean = Mode + $\frac{3}{2}$ (median – mode)

Arithmetic mean is based on all observation: It is not useful if there are some extreme value in the data.

Mode is more useful for business persons, who may not be interested in the magnitude but only in the most common value. For example , while jon shoes of various size of sale odering infected a modal size will be more appropriate.

Medium is useful when there is an open and extreme case, because median is not affected by extreme open values.

Pictorial Representation of Data

The following two terms are generally used for presenting data.

a) Tables

b) Graph/Diagram

Following types of graphs or diagrams are used in representing statistical data.

a) Histogram

b) Frequency polygon

c) Frequency Curve

d) Bar graph

e) Picto graph

f) Pie chart

Pie chart : This is a circular diagram. It is used when comparison of components part is required with other components ad the total. We construct a circle and divide it into number of sectors to represent the relative values of the components of data. Here all given values corresponds to the total number of degrees in the circular are i.e. 360° .

Probability :–

Probability of an event P_2 , written as $P(P_2)$ defined as

$P(P_2)$ = $\dfrac{\text{Total number of cases favourable to } P_2}{\text{Total No. of possible outcomes}}$

In general $0 \leqslant P(P_2) \leqslant 1$

$P(P_2) + P(\text{not } P_2) = 1$

STATISTICS

1. The mean of 10 numbers is 20, if 5 is subtracted from each number. Then new mean will be

   a) 25   b) 15

   c) 35   d) 5

2. The mean of 1st n odd natural number is
   $\dfrac{n^2}{81}$ Then n=
   a) 9
   b) 81
   c) 27
   d) 18

3. If the mean of 5 observations x, x+2, x+4, x+6, x+8 is 11. The mean of first three observations is
   a) 5
   b) 7
   c) 8
   d) 9

4. Mode of the given data 14, 25, 14, 18, 17, 14, 23, 22, 14, 18 is
   a) 14
   b) 18
   c) 25
   d) 22

5. If the Mean of first n natural number is
   $\dfrac{5n}{9}$ then n =
   a) 5
   b) 4
   c) 9
   d) 10

6. Median of the given data 71, 72, 73, 74, 75, 76, 80, 134 is
   a) 85
   b) 75
   c) 80
   d) 70

7. If the mean of 6,4,7, P and 10 is 8, then value of P is
   a) 11
   b) 12
   c) 13
   d) 14

8. The arithmetic mean of 1, 2, 3, 4, ..., *n* is
   a) $\dfrac{n+1}{2}$
   b) $\dfrac{n-1}{2}$
   c) $\dfrac{n}{2}$
   d) $\dfrac{n}{2}+1$

9. If the mean of the following data is 18.75, then value of p

X_1 :	10 :	15 :	p :	25 :	30
f_1 :	5 :	10 :	7 :	8 :	2

   a) 15
   b) 10
   c) 25
   d) 20

10. Given table shows the marks , secured by 140 students in an examination of mathematics paper

Marks	frequency
0 – 10	20
10 – 20	24
20 – 30	40
30 – 40	36
40 – 50	20

    then average marks obtained by a student
    a) 30
    b) 35
    c) 33
    d) 40

11. If the mean of the following distribution is 2.6, then the value of *y* is
    Variable (*x*) : 1 2 3 4 5
    Frequency (*f*) 4 5 y 1 2
    a) 3
    b) 8
    c) 13
    d) 24

12. The relation between mean, median & mode for a moderately skewed distribution is.
    a) mode = 2median - 3mean
    b) mode = median - 2mean
    c) mode = 2median - mean
    d) mode = 3median - 2mean

13. Which of the following cannot be determined graphically ?
    a) Mean
    b) Median
    c) Mode
    d) None of these

14. Find the mean of the frequency distribution

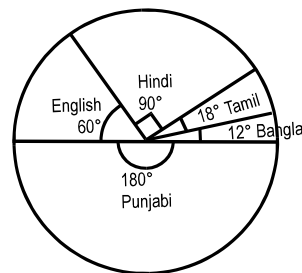 | Class interval | No. of workers |
    |---|---|
    | 0-10 | 7 |
    | 10-20 | 10 |
    | 20-30 | 15 |
    | 30-40 | 8 |
    | 40-50 | 10 |

    a) 24
    b) 25
    c) 25.8
    d) 27

15. The median of given data 15, 35, 18, 26, 19, 25, 29, 27
    a) 20   b) 27
    c) 26   d) 25

16. The class marks of a distribution are 6, 10, 14, 18, 22, 26 then the class size is
    a) 5   b) 8
    c) 4   d) 6

17. The mean of 10,12,16,20, P and 26 is 17 the value of P is
    a) 18   b) 22
    c) 20   d) 16

18. The mode of the following data 14, 25, 14, 28, 18, 19, 18, 14, 23, 22, 14, 18, 22 is
    a) 22   b) 28
    c) 18   d) 14

19. The mean of 42 numbers is 16 . if each number is divided by 4 the new mean is
    a) 8   b) 14
    c) 12   d) 16

20. The mean of 5 number is 26. if one number is excluded, their mean is 24. then the excluded number is
    a) 10   b) 15
    c) 25   d) 30

21. For what value of P, the mode of the following data is 9?
    5, 8, 9, 3, 9, 8, 7, 6, 8, 9, P, 4
    a) 3   b) 8
    c) 9   d) 7

22. If the median of the data 24, 25, 26, x+2, x+3, 30, 31, 34 is 27.5 then x=
    a) 27   b) 25
    c) 28   d) 30

Each of the following question from 23 to 27 refers to the table given below, choose the correct answer

Column	Marks Score	Students
A	20 – 30	4
B	30 – 40	6
C	40 – 50	8
D	50 – 60	7
E	60 – 70	10
F	70 – 80	3

23. The class size of A is
    a) 10   b) 5
    c) 15   d) 20

24. The frequency of B is
    a) 6   b) 4
    c) 8   d) 7

25. The frequency of F is
    a) 6   b) 4
    c) 8   d) 7

26. Upper limit of C
    a) 50   b) 40
    c) 60   d) 30

27. Lower limit of A
    a) 30   b) 40
    c) 20   d) 10

Total 120 students are residing in a hostel. The pie chart in Fig 1 gives you number of students speaking different language. Each of following question from 28 to 31 refers to the pie chart given.
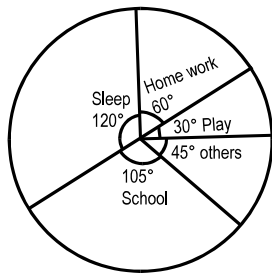

28. Number of students who speak Punjabi
    a) 60   b) 140
    c) 50   d) 30

29. Number of students who speak English ?
    a) 10   b) 20
    c) 30   d) 40

30. Number of students who speak Tamil?
    a) 10   b) 6
    c) 8   d) 4

31. Number of students who speak hindi?
    a) 20   b) 10
    c) 30   d) 40

The pie chart in fig 2 represents the expenditure of a family on different items. Each of the following question 32 to 35 refers to given pie chart

32. The percentage expenditure of the family on food?
    a) $\dfrac{150}{7}$ %   b) $\dfrac{175}{9}$ %
    c) $\dfrac{250}{9}$ %   d) $\dfrac{200}{9}$ %

33. The percentage expenditure of the family on food?
    a) $\dfrac{75}{2}$ %   b) $\dfrac{65}{2}$ %
    c) $\dfrac{25}{2}$ %   d) $\dfrac{45}{2}$ %

34. The percentage expenditure of the family on housing?
    a) $\dfrac{50}{3}$ %   b) $\dfrac{75}{2}$ %
    c) $\dfrac{100}{2}$ %   d) $\dfrac{25}{2}$ %
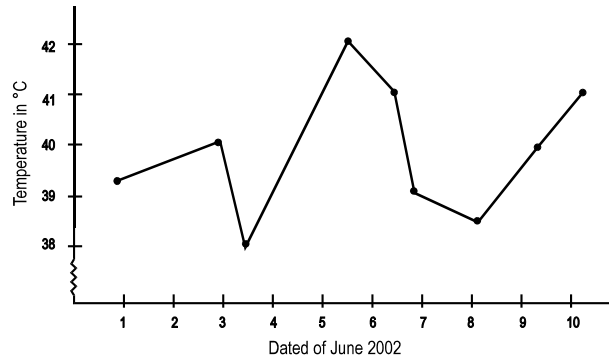
35. The percentage expenditure of the family on study?
    a) $\dfrac{50}{3}$ %   b) $\dfrac{75}{3}$ %
    c) $\dfrac{100}{3}$ %   d) $\dfrac{25}{3}$ %

36. Find the Median of the following frequency distribution

    Wages
    200 – 300   3
    300 – 400   5
    400 – 500   20
    500 – 600   10
    600 – 700   6
    a) 470   b) 450
    c) 430   d) 410

37. If the median of following data is 35. then value of x is 24,27,8,31,34, x, 37, 40, 42, 45
    a) 32   b) 35
    c) 34   d) 36

38. Population birth rate is often calculated per.
    a) 10 persons   b) 100 persons
    c) 1000 persons   d) 10,000 persons

39. Price index number provide the information of
    a) Human Population
    b) Animals Population
    c) Change in Temperature
    d) Change in price fuel

40. Which of the following effects the inflative numbers.
    a) Change in whether
    b) Change in fuel price
    c) Change in Government
    d) None of these

41. Cost living index deals with.
    a) Expenditure in a year
    b) Sale in a year
    c) Change in sale in a year
    d) Human Population

42. Which of following effects the bank interest set by RBI
    a) Increase or decrease in inflation
    b) Increase or decrease in sea level
    c) Increase or decrease in rain
    d) Increase or decrease in population

43. An ogive is a
    a) Histogeam
    b) Bar diagram
    c) Frequency polygon
    d) Cumulative frequency curve

The number of children in 25 families of a locality are recorded as follows. 4, 3, 1, 4, 0, 2, 1, 2, 1, 3, 3, 2, 2, 2, 5, 0, 1, 4, 1, 2, 1, 2, 3, 0, 1 read the above data and answer the following question from question No. 44 to 47.

44. Maximum number of children a family has
    a) 0   b) 1
    c) 4   d) 2

45. Number of families without child
    a) 0   b) 1
    c) 2   d) 3

46. Number of families having less than 4 children but having atleast one child
    a) 16   b) 17
    c) 18   d) 19

47. Number of families having at the most 2 children
    a) 12   b) 13
    c) 14   d) 15

Question No. 48 to 50
    Given below is the graph of temperature on 10 days of June 2002 in Chandigarh

48. The maximum temperature was on
    a) 2nd June   b) 5th June
    c) 7th June   d) 10th June

49. The minimum temperature was on
    a) 1st June   b) 2th June
    c) 3rd June   d) 4th June

50. On the 8th June the temperature was
    a) 38°   b) 38.5°
    c) 39.5°   d) 40.5°

51. Probability of a sure event is
    a) 1   b) 0
    c) -1   d) 2

52. Probability of an impossible event is
    a) 1   b) 0
    c) -1   d) 2

53. A die is rolled once. The probability of getting a prime number is
    a) $\dfrac{1}{4}$ b) 1
    c) -1 d) $\dfrac{1}{6}$

54. Two coins are tossed simultaneously. Find the probabilty of getting two heads
    a) 1/2   b) 1/3
    c) 1/4   d) None of these

55. From deck of 52 cards, one card is drawn at random. Then the probability of getting a king

    a) $\dfrac{1}{26}$ b) $\dfrac{2}{26}$

    c) $\dfrac{3}{26}$ d) $\dfrac{4}{26}$

56. If two coins are tossed simultaneously. Then the probability of getting the atmost one head is

    a) $\dfrac{1}{4}$ b) $\dfrac{1}{2}$

    c) $\dfrac{1}{6}$ d) $\dfrac{3}{4}$

57. A bag contains 5 red balls, 8 white balls and 4 green balls. If one ball is drawn from a bag at random. Find the probability of black ball.

    a) 24   b) 7/24
    c) 7   d) 1/4

58. A card is drawn at random from a place of 52 playing cards. Find the probability that the card drawn is neither a queen nor a jack.

    a) $\dfrac{11}{12}$ b) $\dfrac{11}{13}$

    c) $\dfrac{11}{15}$ d) $\dfrac{11}{17}$

59. The probability of getting a total of greater than 9 in single throw of two dice.

    a) $\dfrac{1}{7}$ b) $\dfrac{1}{5}$

    c) $\dfrac{1}{4}$ d) $\dfrac{1}{9}$

60. Find the probability of drawing a face card in a deck of 52 cards .

    a) $\dfrac{2}{26}$ b) $\dfrac{3}{51}$

    c) $\dfrac{2}{51}$ d) $\dfrac{3}{13}$

61. A die is thrown once. The probability of getting a number less than 5 is

    a) $\dfrac{1}{3}$ b) $\dfrac{1}{2}$

    c) $\dfrac{2}{3}$ d) $\dfrac{1}{4}$

62. In a class of 40 students, there are 25 boys and rest are girls. From them, a class representative has to be selected. The possibility of selecting a girl students as a representative is

    a) $\dfrac{1}{8}$ b) $\dfrac{3}{4}$

    c) $\dfrac{1}{4}$ d) $\dfrac{3}{8}$

63. Which of the following cannot be probability of an event.

    a) 1   b) -1

    c) 0   d) $\dfrac{1}{2}$

64. Two cards are drawn from well shuggled deck of 52 cards what is the probability that these drawn cards are cards of spade ?

    a) 1/19   b) 2/17
    c) 1/17   d) 2/65

65. In a single through of a die the probability of getting of multiple of three.

    a) $\dfrac{1}{2}$ b) $\dfrac{1}{3}$

    c) $\dfrac{1}{6}$ d) $\dfrac{2}{3}$

66. The probability of throwing a number greater than 2 with a fair dice is.

    a) 3/5   b) 2/5
    c) 2/3   d) 1/3

67. A card is drawn at random from a pack of 52 playing cards. The probability, that the card drawn is neither a red card nor a black card.
   a) 1
   b) 0
   c) $\dfrac{1}{2}$
   d) None of these

68. In a single throw a pair of dice, the probability of getting the sum a perfect square is
   a) 1/18
   b) 7/36
   c) 1/6
   d) 2/9

69. The probability that a non leap year has 53 sundays is
   a) 2/7
   b) 5/7
   c) 6/7
   d) 1/7

70. Find the probability of drawing an honour card from a well shuffled pack of 52 cards?
   a) $\dfrac{12}{52}$
   b) $\dfrac{16}{52}$
   c) $\dfrac{8}{52}$
   d) $\dfrac{4}{52}$

71. Two coins are tossed simuetaneously. What is the probability of getling atleast one head?
   a) 1/4
   b) 1/2
   c) 3/4
   d) None of these

STATISTICS

1	b	15	d	29	b	43	d	57	b
2	b	16	c	30	b	44	a	58	b
3	d	17	a	31	c	45	d	59	d
4	a	18	d	32	c	46	c	60	b
5	c	19	b	33	b	47	d	61	c
6	b	20	d	34	a	48	b	62	d
7	c	21	c	35	d	49	c	63	b
8	a	22	b	36	a	50	b	64	c
9	d	23	a	37	d	51	a	65	b
10	c	24	a	38	c	52	b	66	c
11	b	25	d	39	d	53	c	67	b
12	d	26	b	40	b	54	c	68	b
13	a	27	c	41	a	55	b	69	d
14	c	28	a	42	a	56	d	70	c
								71	c