: PRACTICE CONTENT KEY ANSWERS :

10th MATHEMATICS : (LEVEL – 1)

- 1 MARK QUESTIONS

UNIT : POLYNOMIALS

1) Write the degree of the polynomial $2x^4 - 3x^2 + 5x + 6$.

Ans : The degree of this polynomial is 4.

2) Write the degree of the polynomial $3x^3 - 5x^2 - 11x - 3$.

Ans : The degree of this polynomial is 3.

3) Write the degree of the polynomial $2x^2 - 8x + 6$.

Ans : The degree of this polynomial is 2.

4) Write the degree of the polynomial $2x + 3$.

Ans : The degree of this polynomial is 1.

5) Write the degree of the polynomial $x^5 + 4x^4 - 3x^3 + 2x^2 - 5x + 1$.

Ans : The degree of this polynomial is 5.

6) Write the degree of the polynomial $3x + 5$.

Ans : The degree of this polynomial is 1.

7) Write the degree of the polynomial $x^4 - 3x^2 + 5x + 2$.

Ans : The degree of this polynomial is 4.

8) Write the degree of the polynomial $x^3 - 2x^2 + 5x + 1$.

Ans : The degree of this polynomial is 3.

9) What is the value of $p(x) = x^2 - 3x - 4$ when p(-1)

Ans : $p(-1) = (-1)^2 - 3(-1) - 4$
$= 1 + 3 - 4$
$= 0$

10) What is the value of $p(x) = 2x^3 - 3x^2 + 6$ when p(-1).

Ans : $p(-1) = 2(-1)^3 - 3(-1)^2 + 6$
$= -2 - 3 + 6$
$= 1$

11) What is the value of $p(x) = x^2 - 3x - 4$ when p(4).

Ans : $p(4) = (4)^2 - 3(4) - 4$
$= 16 - 12 – 4$
$= 0$

12) What is the value of $p(x) = x^2 + 7x + 10$ when p(2).

Ans : $p(-1) = (2)^2 + 7(2) + 10$
$= 4 + 14 + 10$
$= 28$

13) What is the value of $p(x) = x^3 - 2x^2 - 3x + 5$ when p(2).

Ans : $p(-1) = (2)^3 - 2(2)^2 - 3(2) + 5$
$= 8 - 8 - 6 + 5$
$= -1$

14) What is the value of $p(x) = 2x^3 - 5x^2 + 4x + 8$ when p(1).

Ans : $p(-1) = 2(1)^3 - 5(1)^2 + 4(1) + 8$
$= 2 - 5 + 4 + 8$
$= 9$

15) What is the value of $p(x) = x^3 - 3x^2 + 6$ when p(2).

Ans : $p(-1) = (2)^3 - 3(2)^2 + 6$
$= 8 - 12 + 6$
$= 2$

16) What is the value of $p(x) = x^3 - 2x^2 + 5$ when p(1).

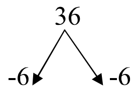
Ans : $p(-1) = (1)^3 - 2(1)^2 + 5$
$= 1 - 2 + 5$
$= 4$

17) $f(x) = 4x^2 - 12x + 9$ is a polynomial. The zeros of this polynomial is

A) $\frac{3}{2}$ & $\frac{3}{2}$ B) 0 & 2   C) 1 & 2   D) 3 & 2

Ans : A) $\frac{3}{2}$ & $\frac{3}{2}$

$4x^2 - 12x + 9$
$\underline{4x^2 - 6x} - \underline{6x + 9}$
$2x\,\underline{(2x - 3)} – 3\,\underline{(2x - 3)}$
$(2x - 3)\,(2x - 3)$
$x = \frac{3}{2}$ & $\frac{3}{2}$



18) Sum of zeros of a quadratic polynomial is 0. If one of the zero is 6, then the quadratic polynomial is

A) $x^2 - 6x + 2$ B) $x^2 - 36$ C) $x^2 - 6$ D) $x^2 – 3$

Ans : B) $x^2 - 36$

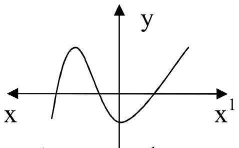
Given, $m + n = 0$ if $m = 6$
$6 + n = 0$
$n = -6$

Standard form of quadratic polynomial is $x^2 – (m + n)\,x + mn$
$= x^2 – [6 + (-6)]\,x + (6)(-6)$
$= x^2 – [\,0\,]\,x + (6)(-6)$
$= x^2 - 36$

19) In given graph $y = f(x)$, the number of zeros of polynomial is

A) 0 B) 1 C) 2 D) 3

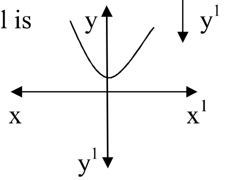
Ans : D) 3



20) In given graph $y = f(x)$, the number of zeros of polynomial is

A) 0 B) 1 C) 2 D) 3

Ans : A) 0



UNIT : PROBABILITY

21) What do you mean by sure event?

Ans : The probability of an event is sure (or certain) to occur is 1. Such an event is called a sure event (certain event).

22) Ram and Raheem are tennis players. They play a tennis match. It is known that the probability of Ram winning the match is 0.62. What is the probability of Raheem winning the match?

Ans : The probability of Raheem winning the match is

$P(E) = 1 - P(\bar{E})$ given, $P(\bar{E}) = 0.62$

$= 1 - 0.62$

$= 0.38$

23) Kavita and Saritha are friends what is the probability the both will have the same birthday?

Ans : $P(E) = \frac{1}{365}$ [1 year = 365 days & 1 day is birthday of Kavita and Saritha]

24) Find the probability of getting a head when a coin is tossed once.

Ans : S ={ H, T } ∴ n(s) = 2 & Certain event A is { H } ∴ n(A) = 1

$$\boxed{P(E) = \frac{n(A)}{n(S)}}$$

25) If $P(E) = 0.05$, then find the value of $P(\bar{E})$.

Ans : $P(E) = 1 - P(\bar{E})$ Given, $P(\bar{E}) = 0.05$

$= 1 - 0.05$

$= 0.95$

26) What is the sum of the probabilities of all elementary events of an experiment?

Ans : 1 (One)

27) What is the Complementary events?

Ans : For any even E, $P(E) + P(\bar{E}) = 1$, Where Ē stands for " not E ". E & Ē are called The Complementary events.

28) How many outcomes are possible, if you throw a dice once?

Ans : S = { 1, 2, 3, 4, 5,6 }

∴ 6 outcomes are possible, if we throw a dice once.

UNIT : QUADRATIC EQUATIONS

29) In a quadratic equation, if $b^2 - 4ac = 0$ then the nature of roots are

A) Real and distinct B) Roots are real and equal

C) No real roots D) Roots are imaginary

Ans : B) Roots are real and equal

30) Discriminant of $px^2 + qx - r = 0$ is

A) $q^2 + 4pr$ B) $q^2 - 4pr$ C) $p^2 - 4qr$ D) $q^2 - 4qr$

Ans : A) $q^2 + 4pr$

Discriminant of a quadratic equation is $\Delta = b^2 - 4ac$

Here $b = q$, $a = p$ & $c = -r$ then, $\Delta = q^2 - 4p(-r)$

$\Delta = q^2 + 4pr$

31) Roots of the quadratic equation $x^2 + 7x + 12 = 0$ are

A) -4, 3 B) 4, -3 C) 4, 3 D) -4, -3

Ans : D) -4, -3

$x^2 + 7x + 12 = 0$

$\underline{x^2 + 4x} + \underline{3x + 12 = 0}$

$x\,\underline{(x + 4)} + 3\,\underline{(x + 4)} = 0$

$(x + 4)(x + 3) = 0$

$x + 4 = 0$ & $x + 3 = 0$

∴ $x = -4$ & $x = -3$

32) If the discriminant of a quadratic equation $kx(x-2) + 6 = 0$ is equal, then the value of k is

A) 2 B) 0 C) 6 D) 8

Ans : C) 6

Given, $kx(x-2) + 6 = 0$

$kx^2 - 2kx + 6 = 0$∴

∴ $a = k$, $b = -2k$ & $c = 6$

Discriminant of a quadratic equation is 0. So, $\Delta = b^2 - 4ac = 0$

$(-2k)^2 - 4(k)(6) = 0$

$4k^2 - 24k = 0$

$4k(k - 6) = 0$

$4k = 0$ & $k - 6 = 0$

Then, $k \neq 0$ & $k = 6$

33) " Length of a rectangular garden is twice of its breadth and its area is 800 cm^2."

The algebraic expression for this statement is

A) $x(2x) = 800$ B) $x(x + 2) = 800$ C) $x(x - 2x) = 800$ D) $x(x + 2x) = 800$

Ans : A) $x(2x) = 800$ [area of a rectangle is A = length x breath]

34) Discriminant of $2x^2 - 3x + 5 = 0$ is

A) 29 B) 19 C) 49 D) -31

Ans : D) -31

Discriminant of a quadratic equation is $\Delta = b^2 - 4ac$

Here b = -3, a = 2 & c = 5 then, $\Delta = (-3)^2 - 4(2)(5)$

$\Delta = 9 - 40$

$\Delta = -31$

35) General form of $x^2 - 2x = (-2)(3 - x)$ is

A) $x^2 + 4x + 6 = 0$ B) $x^2 - 4x + 6 = 0$ C) $x^2 - 4x - 6 = 0$ D) $x^2 + 4x - 6 = 0$

Ans : B) $x^2 - 4x + 6 = 0$

$x^2 - 2x = (-2)(3 - x)$

$x^2 - 2x = -6 + 2x$

$x^2 - 2x + 6 - 2x = 0$

$x^2 - 4x + 6 = 0$

36) "Sum of the square of two consecutive odd positive integers is 290."

The algebraic expression for this statement is

A) $x^2 + (x + 1)^2 = 290$ B) $x^2 + (x - 1)^2 = 290$

C) $x^2 + (x + 2)^2 = 290$ D) $x^2 + (x - 2)^2 = 290$

Ans : C) $x^2 + (x + 2)^2 = 290$

UNIT : ARITHMETIC PROGRESSION

37) If $a_n = 3n - 2$, then the value of a_4 is

A) 11 B) 8 C) 10 D) 12

Ans : C) 10

$\because a_4 = 3(4) - 2$

$= 12 - 2$

$a_4 = 10$

38) If $a_n = 2n^2 - 2$, then the value of a_3 is

A) 14 B) 25 C) 18 D) 16

Ans : D) 16

$\because a_n = 2(3)^2 - 2$

$= 2(9) - 2$

$= 18 - 2$

$a_3 = 16$

39) The common difference of the arithmetic progression 3, 1, -1, 3…. is

A) 2 B) -2 C) 0 D) 1

Ans : B) -2

$\because d = a_2 - a_1$

$= 1 - 3$

$= -2$

40) The 6th term of the arithmetic progression 2, 5, 8…. is

A) 15 B) 16 C) 17 D) 18

Ans : C) 17

$\because a_n = a + (n - 1) d$ a = 2, n = 6, d = 5 – 2 = 3

$a_6 = 2 + (6 - 1) 3$

$= 2 + (5)3$

$= 2 + 15$

$a_6 = 17$

41) The 8th term of arithmetic progression 2, 7, 12…. is

A) 35 B) 36 C) 37 D) -38

Ans : C) 37

$\because a_n = a + (n - 1) d$ a = 2, n = 8, d = 7 – 2 = 5

$a_8 = 2 + (8 - 1) 5$

$= 2 + (7) 5$

$= 2 + 35$

$a_8 = 37$

42) If $a_n = 5 - 2n$, then value of a_3 is

A) 2 B) -2 C) 3 D) -1

Ans : D) -1

$\because a_n = 5 - 2(3)$

$a_3 = 5 - 6$

$= -1$

43) 5, ☐ ,13. One of the following can be written in box is

A) 3 B) 5 C) 7 D) 9

Ans : D) 9

$\because$ Mean $= \frac{a + b}{2} = \frac{5 + 13}{2} = 9$

44) The nth term of the arithmetic progression 4, 2, 0, -2…. is

A) 4 - 2n B) 4 + 2n C) 2 + 2n D) 2 – 2n

Ans : D) 2 – 2n

$\because a_n = a + (n - 1) d$ a = 4, n = n, d = 2 – 4 = -2

$= 4 + (n - 1) -2$

$= 4 - 2n + 2$

$a_n = 2 - 2n$

UNIT : THEOREMS

45) Sides of two similar triangles in the ratio 4 : 9. Area of triangles are in the ratio is

A) 1 : 2 B) 2 : 3 C) 16 : 81 D) 81 : 16

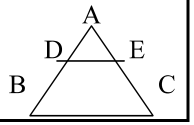
Ans : C) 16 : 81

$$\because \frac{\text{Area of triangle} - 1}{\text{Area of triangle} - 2} = \frac{(CORRESPONDING\ SIDE - 1)^2}{(CORRESPONDING\ SIDE - 2)^2} = \frac{4^2}{9^2} = \frac{16}{81}$$

46) In the adjoining figure, If DE || AC, AD = 1cm, DB = 2cm, & AE = 3cm, then length of EC is

A) 2cm B) 5cm C) 4cm D) 6cm

Ans : D) 6cm



$\because \quad \frac{AD}{DB} = \frac{AE}{EC}$

$\frac{1}{2} = \frac{3}{EC}$

EC = 6cm

47) The Pythagorian triplet among the following is

A) 3, 6, 5 B) 5, 12, 13 C) 17, 21, 24 D) 9, 12, 14

Ans : B) 5, 12, 13

$\because \quad 13^2 = 12^2 + 5^2$

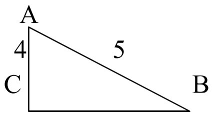
$169 = 144 + 25$

$169 = 169$

48) In right angled ΔABC, ∠C = 90^0. If the length of AB = 5cm, AC = 4cm, then length of BC is

A) 2 B) 3 C) 6 D) 8

Ans : B) 3



By Pythagoras theorem $AB^2 = AC^2 + BC^2$

$BC^2 = AB^2 - AC^2$

$= 5^2 - 4^2$

$BC = \sqrt{25 - 16} = \sqrt{9} = 3$

49) Areas of two similar triangles are in the ratio 81 : 16. Sides of these triangles are in the ratio is

A) 4 : 9 B) 2 : 4 C) 9 : 4 D) 3 : 4

Ans : C) 9 : 4

$$\because \frac{\text{Area of triangle} - 1}{\text{Area of triangle} - 2} = \frac{(\,CORRESPONDING\ SIDE-1\,)^2}{(\,CORRESPONDING\ SIDE-2\,)^2}$$

$$\frac{(\,CORRESPONDING\ SIDE-1\,)}{(\,CORRESPONDING\ SIDE-2\,)} = \frac{\sqrt{(\text{ Area of triangle} - 1\text{ })}}{\sqrt{(\text{ Area of triangle} - 2\text{ })}} = \frac{\sqrt{81}}{\sqrt{16}} = \frac{9}{4}$$

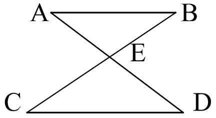
50) In a right angled ΔABC, AB = 10cm, BC = 8cm, AC = 6cm, then the vertex of the right angled triangle is

A) ∠A B) ∠B C) ∠C D) $\angle D$

Ans : C) ∠C

∵ According to given data AB is diagonal. So, ∠C vertex of the right angle.

51) In the adjoining figure, the corresponding angles are



A) ∠A & ∠C B) ∠A & ∠B

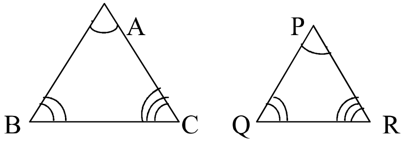
C) ∠D & ∠B D) ∠A & ∠D

Ans : D) ∠A & ∠D

52) In the adjoining figure, if ΔABC ≅ ΔPQR ,then the ratio of the corresponding sides are

A) $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$ B) $\frac{AB}{PR} = \frac{AC}{PQ} = \frac{BC}{QR}$

C) $\frac{AC}{PQ} = \frac{AB}{PR} = \frac{BC}{QR}$ D) $\frac{BC}{PQ} = \frac{AC}{PR} = \frac{AB}{QR}$



Ans : A) $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$

UNIT : SURFACE AREA AND VOLUMES

53. Write the formula of total surface area of a cylinder.

Ans : A = 2πr (h + r)

54. Write the formula of volume of a cone.

Ans : $V = \frac{1}{3}\pi r^2 h$

55. Write the formula of curved surface area of frustum of a cone.

Ans : $A = \pi(r_1 + r_2)l$

56. Write the formula of total surface area of frustum of a cone.

Ans : $A = \pi(r_1 + r_2)l + \pi r_1^2 + \pi r_2^2$

57. Write the formula of volume of frustum of a cone.

Ans : $V = \frac{1}{3}\pi h\,(r_1^2 + r_2^2 + r_1 r_2)$

58. Write the formula of total surface area of a cuboid.

Ans : A = 2 [lb + bh + hl]

59. Write the formula of total surface area of a cone.

Ans : A = πr (l + r)

60. Write the formula of curved surface area of a cuboid.

Ans : A = 2h[l + b]

UNIT : COORDINATE GEOMETRY

61. Write the formula of the distance between origin and point P(x, y).

Ans : $d = \sqrt{x^2 + y^2}$

62. Write the coordinates of the origin.

Ans : The coordinates of the origin is (0, 0)

63. Find the distance between the points (4, -3) and origin.

Ans : $d = \sqrt{x^2 + y^2}$

$d = \sqrt{(4)^2 + (-3)^2}$

$d = \sqrt{16 + 9}$

$d = \sqrt{25}$

64. Find the distance between the points (2, 3) and (6, -8).

$(x_1 , y_1) = (2, 3)$

$(x_2 , y_2) = (6, -8)$

Ans : $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$d = \sqrt{(6-2)^2 + (-8-3)^2}$

$d = \sqrt{(\ 4\ )^2 + (-11\ )^2}$

$d = \sqrt{16\ + 121}$

$d = \sqrt{137}$

➢ 2 MARK QUESTIONS

UNIT : REAL NUMBERS

Prove that the following are irrational numbers :

1) Prove that $3 + \sqrt{5}$ is an irrational number

Ans :- Let us assume that $3+\sqrt{5}$ is a rational number

Now, $3 + \sqrt{5} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$\sqrt{5} = \frac{a}{b} - 3$

$\sqrt{5} = \frac{a-3b}{b}$

Here , $\frac{a-3b}{b}$ is a rational number.

But we know that $\sqrt{5}$ is a irrational number.

So, $\frac{a-3b}{b}$ is also a irrational number.

So, our assumption is wrong.

$3 + \sqrt{5}$ is a irrational number.

2) Prove that $5 - \sqrt{3}$ is an irrational number

Ans :- Let us assume that $5 - \sqrt{3}$ is a rational number

Now, $5 - \sqrt{3} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$5 - \frac{a}{b} = \sqrt{3}$

$\sqrt{3} = \frac{5b-a}{b}$

Here , $\frac{5b-a}{b}$ is a rational number.

But we know that $\sqrt{3}$ is a irrational number.

So, $\frac{5b-a}{b}$ is also a irrational number.

So, our assumption is wrong.

$5 - \sqrt{3}$ is a irrational number.

3) Prove that $2 - \sqrt{2}$ is an irrational number

Ans :- Let us assume that $2 - \sqrt{2}$ is a rational number

Now, $2 - \sqrt{2} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$2 - \frac{a}{b} = \sqrt{2}$

$\sqrt{2} = \frac{2b-a}{b}$

Here , $\frac{2b-a}{b}$ is a rational number.

But we know that $\sqrt{2}$ is a irrational number.

So, $\frac{2b-a}{b}$ is also a irrational number.

So, our assumption is wrong.

$2 - \sqrt{2}$ is a irrational number.

4) Prove that $\sqrt{3} + 1$ is an irrational number

Ans :- Let us assume that $\sqrt{3} + 1$ is a rational number

Now, $\sqrt{3} + 1 = \frac{a}{b}$ (Here a and b are co- prime numbers)

$\sqrt{3} = \frac{a}{b} - 1$

$\sqrt{3} = \frac{a-b}{b}$

Here , $\frac{a-b}{b}$ is a rational number.

But we know that $\sqrt{3}$ is a irrational number.

So, $\frac{a-b}{b}$ is also a irrational number.

So, our assumption is wrong.

$\sqrt{3} + 1$ is a irrational number.

5) Prove that $7 - \sqrt{3}$ is an irrational number

Ans :- Let us assume that $7 - \sqrt{3}$ is a rational number

Now, $7 - \sqrt{3} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$7 - \frac{a}{b} = \sqrt{3}$

$\sqrt{3} = \frac{7b-a}{b}$

Here , $\frac{7b-a}{b}$ is a rational number.

But we know that $\sqrt{3}$ is a irrational number.

So, $\frac{7b-a}{b}$ is also a irrational number.

So, our assumption is wrong.

$7 - \sqrt{3}$ is a irrational number.

6) Prove that $5 - 2\sqrt{3}$ is an irrational number

Ans :- Let us assume that $5 - 2\sqrt{3}$ is a rational number

Now, $5 - 2\sqrt{3} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$5 - \frac{a}{b} = 2\sqrt{3}$

$\sqrt{3} = \frac{5b-a}{2b}$

Here , $\frac{5b-a}{2b}$ is a rational number.

But we know that $2\sqrt{3}$ is a irrational number.

So, $\frac{5b-a}{2b}$ is also a irrational number.

So, our assumption is wrong.

$5 - 2\sqrt{3}$ is a irrational number.

7) Prove that $2 - \sqrt{5}$ is an irrational number

Ans :- Let us assume that $2 - \sqrt{5}$ is a rational number

Now, $2 - \sqrt{5} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$2 - \frac{a}{b} = \sqrt{5}$

$\sqrt{5} = \frac{2b - a}{b}$

Here , $\frac{2b - a}{b}$ is a rational number.

But we know that $\sqrt{5}$ is a irrational number.

So, $\frac{2b - a}{b}$ is also a irrational number.

So, our assumption is wrong.

$2 - \sqrt{5}$ is a irrational number.

8) Prove that $\sqrt{2} + 3$ is an irrational number

Ans :- Let us assume that $\sqrt{2} + 3$ is a rational number

Now, $\sqrt{2} + 3 = \frac{a}{b}$ (Here a and b are co- prime numbers)

$\sqrt{2} = \frac{a}{b} - 3$

$\sqrt{2} = \frac{a - 3b}{b}$

Here , $\frac{a - 3b}{b}$ is a rational number.

But we know that $\sqrt{2}$ is a irrational number.

So, $\frac{a - 3b}{b}$ is also a irrational number.

So, our assumption is wrong.

$\sqrt{2} + 3$ is a irrational number.

9) Prove that $2 + \sqrt{3}$ is an irrational number

Ans :- Let us assume that $2 + \sqrt{3}$ is a rational number

Now, $2 + \sqrt{3} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$\sqrt{3} = \frac{a}{b} - 2$

$\sqrt{3} = \frac{a - 2b}{b}$

Here , $\frac{a - 2b}{b}$ is a rational number.

But we know that $\sqrt{3}$ is a irrational number.

So, $\frac{a - 2b}{b}$ is also a irrational number.

So, our assumption is wrong.

$2+\sqrt{3}$ is a irrational number.

10) Prove that $6 + \sqrt{5}$ is an irrational number

Ans :- Let us assume that $6 + \sqrt{5}$ is a rational number

Now, $6 + \sqrt{5} = \frac{a}{b}$ (Here a and b are co- prime numbers)

$\sqrt{5} = \frac{a}{b} - 6$

$\sqrt{5} = \frac{a - 6b}{b}$

Here , $\frac{a - 6b}{b}$ is a rational number.

But we know that $\sqrt{5}$ is a irrational number.

So, $\frac{a - 6b}{b}$ is also a irrational number.

So, our assumption is wrong.

$6+\sqrt{5}$ is a irrational number.

UNIT : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Solve the following pair of linear equations in two variables { For any method }:

11) $x + 2y = 9$ & $2x - y = 8$

Ans : $(x + 2y = 9)$ --------(1)

$\underline{(2x - y = 8)}$ --------(2)

$\Rightarrow \cancel{2x} + 4y = 18$ [Equation (1) multiply by 2]

$\Rightarrow \cancel{2x} - y = 8$

$\underline{(-)\quad(+)\quad(-)}$

$5y = 10$ [By subtracting (2) from (1)]

$\boxed{\therefore y = 2}$

Let, $x + 2y = 9$

$x + 2(2) = 9$ [By substituting the value y in (1)]

$x + 4 = 9$

$x = 9 - 4$

$\boxed{\therefore x = 5}$

12) $2x + y - 6 = 0$ & $4x - 2y - 4 = 0$

$2x + y - 6 = 0$ ---------(1)

$\underline{4x - 2y - 4 = 0}$---------(2)

$2x + \cancel{y} - 6 = 0$

$\underline{2x - \cancel{y} - 2 = 0}$ [Equation (2) dividing by 2]

$4x + 0 - 8 = 0$ [By adding (1) & (2)]

$4x = 8$

$\boxed{\therefore x = 2}$

Let, $2x + y - 6 = 0$

$2(2) + y = 6$ [By substituting the value x in (1)]

$4 + y = 6$

$y = 6 - 4$

$\boxed{\therefore y = 2}$

13) $2x + 2y = 3$ & $2x - 3y = 8$

$\cancel{2x} + 2y = 3$----------(1)

$\cancel{2x} - 3y = 8$ ----------(2)

$\underline{(-)\quad(+)\quad(-)}$

$5y = -5$ [By subtracting (2) from (1)

$\boxed{\therefore y = -1}$

Let, $2x + 2y = 3$

$2x + 2(-1) = 3$ [By substituting the value y in (1)]

$2x - 2 = 3$

$2x = 3 + 2$

$\boxed{\therefore x = \frac{5}{2}}$

14) $2x - 2y = 8$ & $4x - 6y = 8$

$2x - 2y = 8$ --------(1)

$\underline{4x - 6y = 8}$ --------(2)

$\cancel{2x} - 2y = 8$

$\cancel{2x} - 3y = 4$ [Equation (2) dividing by 2]

$\underline{(-)\ \ (+)\ \ (-)}$

$\boxed{\therefore y = 4}$ [By subtracting (2) from (1)]

Let, $2x - 2y = 8$

$2x - 2(4) = 8$ [By substituting the value y in (1)]

$2x - 8 = 8$

$2x = 8 + 8$

$2x = 16$

$\boxed{\therefore x = 8}$

15) $x + 3y = 6$ & $2x - 3y = 12$

$x + \cancel{3y} = 6$---------(1)

$\underline{2x - \cancel{3y} = 12}$--------(2) [By adding (1) & (2)]

$3x \quad = 18$

$\boxed{\therefore x = 6}$

Let, $x + 3y = 6$

$6 + 3y = 6$ [By substituting the value x in (1)]

$3y = 6 - 6$

$3y = 0$ $\boxed{\therefore y = 0}$

16) $x + 2y = 3$ & $2x - 6 - 3y = 0$

$x + 2y = 3$------------(1)

$\underline{2x - 6 - 3y = 0}$ ------(2)

$\Rightarrow (x + 2y = 3)2 \Rightarrow \cancel{2x} + 4y = 6$ [Equation (1) multiply by 2]

$\rightarrow 2x - 3y = 6 \rightarrow \cancel{2x} - 3y = 6$

$\underline{(-)\ \ (+)\ \ (-)}$

$7y \ = 0$ [By subtracting (2) from (1)]

$\boxed{\therefore y = 0}$

Let, $x + 2y = 3$

$x + 2(0) = 3$ [By substituting the value y in (1)]

$x = 3 - 0$

$\boxed{\therefore x = 3}$

17) $x - 7y + 42 = 0$ & $x - 3y = 6$

$x - 7y + 42 = 0$ ------------(1)

$\underline{x - 3y = 6}$ ------------------(2)

$\Rightarrow \cancel{x} - 7y = -42$

$\Rightarrow \cancel{x} - 3y = 6$

$\underline{(-)\ \ (+)\ \ (-)}$ [By subtracting (2) from (1)]

$-4y = -48$

$\boxed{\therefore y = 12}$

Let, $x - 3y = 6$

$x - 3(12) = 6$ [By substituting the value y in (1)]

$x - 36 = 6$

$x = 6 + 36$

$\boxed{\therefore x = 42}$

18) $2x + 3y = 5$ & $x + 2y = 3$

$2x + 3y = 5$-------------(1)

$\underline{x + 2y = 3}$------------- (2)

$\Rightarrow \cancel{2x} + 3y = 5$

$\Rightarrow \cancel{2x} + 4y = 6$ [Equation (2) multiply by 2]

$\underline{(-)\ \ (-)\ \ (-)}$

$-y \ = -1$ [By subtracting (2) from (1)]

$\boxed{\therefore y = 1}$

Let, $x + 2y = 3$

$x + 2(1) = 3$ [By substituting the value y in (1)]

$x + 2 = 3$

$x = 3 - 2$

$\boxed{\therefore x = 1}$

19) $x - 3y + 3 = 0$ & $2x + y = 8$

$x - 3y + 3 = 0$ ---------------(1)

$\underline{2x + y = 8}$ ---------------(2)

$x - \cancel{3y} = -3$

$\underline{6x + \cancel{3y} = 24}$

$7y \quad = 21$ [By adding (1) & (2)]

$\boxed{y = 3}$

Let, $x - 3y = -3$

$x = 3y - 3$ [By substituting the value y in (1)]

$x = 3(3) - 3$

$x = 9 - 3$

$\boxed{\therefore x = 6}$

20) $y = 2 - x$ & $y = 2 + x$

$y = 2 - x$

$\underline{y = 2 + x}$ [By adding (1) & (2)]

$2y = 4$

$\boxed{\therefore y = 2}$

Let, $y = 2 + x$ [By substituting the value y in (2)]

$2 = 2 + x$

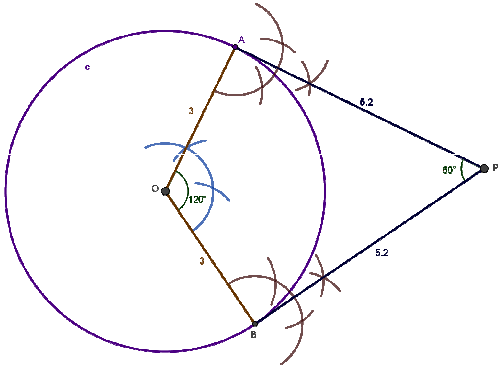
$x = 2 - 2$

$\boxed{\therefore x = 0}$

: 2 MARK QUESTIONS :

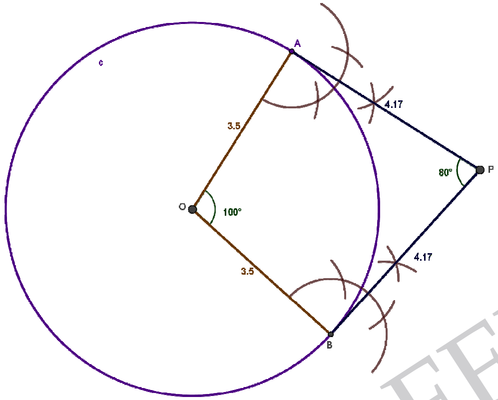
CONSTRUCTIONS

21) Radius of a circle is 3cm, angle between radii is 120°. Construct the pair of tangent at the end points of the radii.



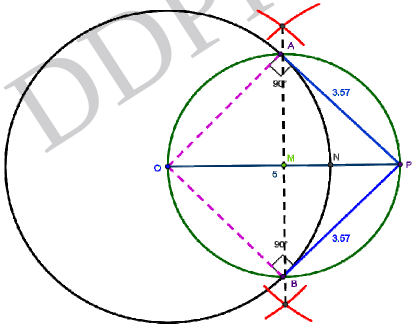
PA and PB are the tangents.

22) Construct the pair of tangent at the end point of radii to a circle of radius 3.5cm in which the angle between the radii is 100°.



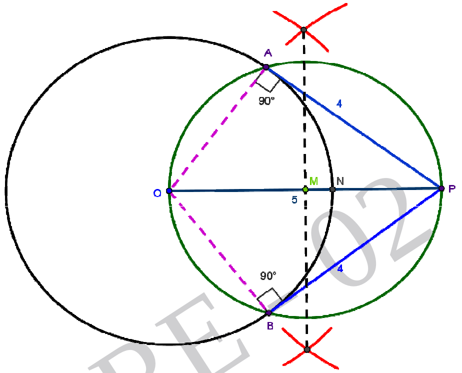
PA and PB are the tangents.

23) Radius of a circle is 3.5cm, distance between the external point P is 5cm and O is the centre of the circle. Construct the pair of tangents to the circle from an external point P.



PA and PB are the tangents.

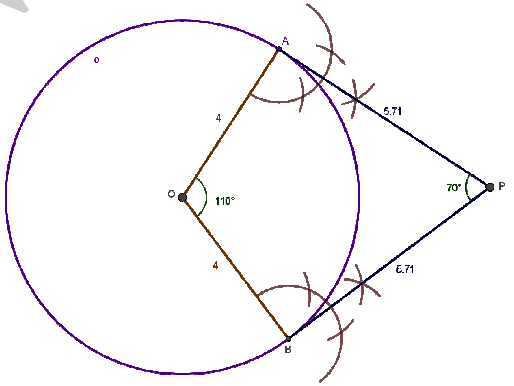
24) Radius of a circle is 3cm, construct two tangents to the circle from an external point which is 2cm away from the circumference of the circle.



$OP = ON + PN = 5cm$

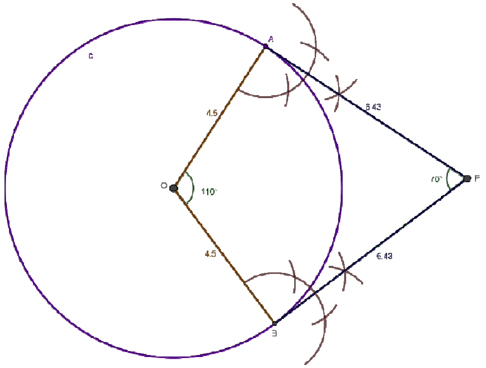
PA and PB are the tangents.

25) Construct tangent at the end points of radii circle of radius 4cm in which angle between radii is 110°.



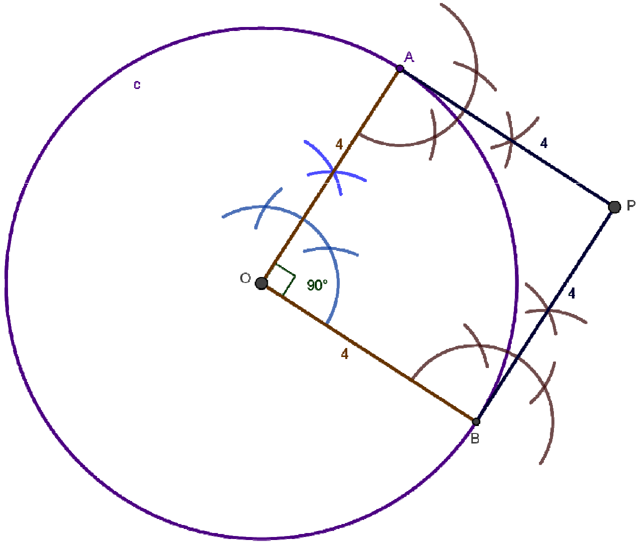
PA and PB are the tangents.

26) Construct tangent at the end points of radius of a circle whose radius is 4.5 cm angle between tangents is 70°.



PA and PB are the tangents.

27) Construct tangents to the circle at the end points of radius which is 4 cm and the angle between the radii is 90°.



PA and PB are the tangents.

UNIT : QUADRATIC EQUATIONS

Solve the below quadratic equations by using the formula :

28) $x^2 - 3x - 4 = 0$

29) $x^2 + 4x = 5$

30) $2x^2 - 7x + 3 = 0$

31) $x^2 - 2x = 2$

32) $x^2 + 2x - 143 = 0$

33) $x^2 - 3x = 10$

34) $2x^2 + x - 6 = 0$

35) $2x^2 - 5x = -3$

36) $x^2 + 48x = 324$

37) $3x^2 - 5x + 2 = 0$

28) $x^2 - 3x - 4 = 0$

$a = 1,\ b = -3,\ c = -4$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-4)}}{2(1)}$$

$$= \frac{3 \pm \sqrt{9 + 16}}{2}$$

$$= \frac{3 \pm \sqrt{25}}{2}$$

$$= \frac{3 \pm 5}{2}$$

$$x = \frac{3 + 5}{2} = \frac{8}{2} = 4 \quad \&$$

$$x = \frac{3 - 5}{2} = \frac{-2}{2} = -1$$

The roots are [4, -1]

29) $x^2 + 4x = 5$

$a = 1,\ b = 4,\ c = -5$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(4) \pm \sqrt{(4)^2 - 4(1)(-5)}}{2(1)}$$

$$= \frac{-4 \pm \sqrt{16 + 20}}{2}$$

$$= \frac{-1 \pm \sqrt{36}}{2}$$

$$= \frac{-1 \pm 6}{2}$$

$$x = \frac{-1 + 6}{2} = \frac{5}{2} \quad \&$$

$$x = \frac{-1 - 6}{2} = \frac{-7}{2}$$

The roots are $[\ \frac{5}{2},\ \frac{-7}{2}\ ]$

30) $2x^2 - 7x + 3 = 0$

$a = 2,\ b = -7,\ c = 3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(3)}}{2(2)}$$

$$= \frac{7 \pm \sqrt{49 - 24}}{4}$$

$$= \frac{7 \pm \sqrt{25}}{4}$$

$$= \frac{7 \pm 5}{4}$$

$$x = \frac{7 + 5}{4} = \frac{12}{4} = 3 \quad \&$$

$$x = \frac{7 - 5}{4} = \frac{2}{4} = \frac{1}{2}$$

The roots are $[\ 3,\ \frac{1}{2}\ ]$

31) $x^2 - 2x = 2$

$a = 1,\ b = -2,\ c = -2$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-2)}}{2(1)}$$

$$= \frac{2 \pm \sqrt{4 + 8}}{2}$$

$$= \frac{2 \pm \sqrt{12}}{2}$$

$$x = \frac{2 + 4\sqrt{3}}{2} = 1 + 2\sqrt{3} \quad \&$$

$$= \frac{2 - 4\sqrt{3}}{2} = 1 - 2\sqrt{3}$$

The roots are $[1+2\sqrt{3},\ 1-2\sqrt{3}]$

32) $x^2 + 2x - 143 = 0$

$a = 1,\ b = 2,\ c = -143$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-143)}}{2(1)}$$

$$= \frac{-2 \pm \sqrt{4 + 572}}{2}$$

$$= \frac{-2 \pm \sqrt{576}}{2} = = \frac{-2 \pm 24}{2}$$

$$x = \frac{-2 + 24}{2} = \frac{22}{2} = 11 \quad \&$$

$$x = \frac{-2 - 24}{2} = \frac{-26}{2} = -13$$

The roots are [11, -13]

33) $x^2 - 3x = 10$

$a = 1,\ b = -3,\ c = -10$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-10)}}{2(1)}$$

$$= \frac{3 \pm \sqrt{9 + 40}}{2}$$

$$= \frac{3 \pm \sqrt{49}}{2} = \frac{3 \pm 7}{2}$$

$$x = \frac{3 + 7}{2} = \frac{10}{2} = 5 \quad \&$$

$$x = \frac{3 - 7}{2} = \frac{-4}{2} = -2$$

The roots are [5, -2]

34) $2x^2 + x - 6 = 0$

$a = 2,\ b = 1,\ c = -6$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(1) \pm \sqrt{(1)^2 - 4(2)(-6)}}{2(2)}$$

$$= \frac{-1 \pm \sqrt{1 + 48}}{4}$$

$$= \frac{-1 \pm \sqrt{49}}{4}$$

$$= \frac{-1 \pm 7}{4}$$

$$x = \frac{-1 + 7}{4} = \frac{6}{4} = \frac{3}{2} \quad \&$$

$$x = \frac{-1 - 7}{4} = \frac{-8}{2} = -4$$

The roots are [$\frac{3}{2}$, -4]

35) $2x^2 - 5x = -3$

$a = 2,\ b = -5,\ c = 3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(3)}}{2(2)}$$

$$= \frac{5 \pm \sqrt{25 - 24}}{4}$$

$$= \frac{5 \pm \sqrt{1}}{4}$$

$$= \frac{5 \pm 1}{4}$$

$$x = \frac{5 + 1}{4} = \frac{6}{4} = \frac{3}{2} \quad \&$$

$$x = \frac{5 - 1}{2} = \frac{4}{2} = 2$$

The roots are [4, -1]

36) $x^2 + 48x = 324$

$a = 1,\ b = 48,\ c = 324$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(48) \pm \sqrt{(48)^2 - 4(1)(324)}}{2(1)}$$

$$= \frac{-48 \pm \sqrt{2304 + 1296}}{2}$$

$$= \frac{-48 \pm \sqrt{3600}}{2}$$

$$= \frac{-48 \pm 60}{2}$$

$$x = \frac{-48 + 60}{2} = \frac{12}{2} = 6 \quad \&$$

$$x = \frac{-48 - 60}{2} = \frac{-108}{2} = -94$$

The roots are [6, -94]

37) $3x^2 - 5x + 2 = 0$

$a = 3,\ b = -5,\ c = 2$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(2)}}{2(3)}$$

$$= \frac{5 \pm \sqrt{25 - 24}}{6}$$

$$= \frac{5 \pm \sqrt{1}}{4}$$

$$= \frac{5 \pm 1}{4}$$

$$x = \frac{5 + 1}{4} = \frac{6}{4} = \frac{3}{2} \quad \&$$

$$x = \frac{5 - 1}{4} = \frac{4}{4} = 1$$

The roots are [$\frac{3}{2}$, 1]

UNIT : POLYNOMIALS

Divide p(x) by g(x) and find the quotient and remainder :

38) $p(x) = x^3 - 2x^2 + 4x - 4,\ g(x) = x - 2$

39) $p(x) = x^3 - 3x^2 + 4x - 4,\ g(x) = x - 1$

40) $p(x) = x^5 - 4x^3 + x^2 + 3x + 1,\ g(x) = x^3 - 5x + 1$

41) $p(x) = x^2 + 5x - 3,\ g(x) = x + 3$

42) $p(x) = 2x^2 + 3x + 1,\ g(x) = x + 2$

43) $p(x) = x^3 - 7x^2 + 3x - 6,\ g(x) = x - 3$

44) $p(x) = x^3 - 2x^2 - 5x - 2,\ g(x) = x - 5$

45) $p(x) = x^3 - 2x^2 + 3x - 6,\ g(x) = x - 2$

46) $p(x) = 3x^3 + x^2 + 2x + 5,\ g(x) = 1 + 2x + x^2$

47) $p(x) = x^3 - 3x^2 + 5x - 3,\ g(x) = x - 2$

38 $p(x) = x^3 - 2x^2 + 4x - 4$

$g(x) = x - 2$

$(x^2 + 4) \longrightarrow$ **quotient**

$x - 2 \enclose{longdiv}{}$ $\cancel{x^3} - \cancel{2x^2} + 4x - 4$

$\cancel{x^3} - \cancel{2x^2}$

$(-) \quad (+)$

$4x - 4$

$4x - 8$

$(-) \quad (+)$

$+4 \longrightarrow$ **remainder**

39 $p(x) = x^3 - 3x^2 + 4x - 4$

$g(x) = x - 1$

$(x^2 - 2x + 2) \longrightarrow$ **quotient**

$x - 1$) $\cancel{x^3} - 3x^2 + 4x - 4$

$\cancel{x^3} - x^2$

$(-) \quad (+)$

$-\cancel{2x^2} + 4x$

$-\cancel{2x^2} + 2x$

$(+) \quad (-)$

$\cancel{2x} - 4$

$\cancel{2x} - 2$

$(-) \quad (+)$

$-2 \longrightarrow$ **remainder**

40 $p(x) = x^5 - 4x^3 + x^2 + 3x + 1$

$g(x) = x^3 - 5x + 1$

$(x^2 + 1) \longrightarrow$ **quotient**

$x^3 - 5x + 1$) $\cancel{x^5} - 4x^3 + \cancel{x^2} + 3x + 1$

$\cancel{x^5} - 5x^3 + \cancel{x^2}$

$(-) \quad (+) \quad (-)$

$\cancel{x^3} + 3x + \cancel{1}$

$\cancel{x^3} - 5x + \cancel{1}$

$(-) \quad (+) \quad (-)$

$8x \longrightarrow$ **remainder**

41 $p(x) = x^2 + 5x - 3$

$g(x) = x + 3$

$(x + 2) \longrightarrow$ **quotient**

$x + 3$) $\cancel{x^2} + 5x - 3$

$\cancel{x^2} + 3x$

$(-) \quad (-)$

$\cancel{2x} - 3$

$\cancel{2x} + 6$

$(-) \quad (-)$

$-9 \longrightarrow$ **remainder**

42 $p(x) = 2x^2 + 3x + 1$

$g(x) = x + 2$

$(2x - 1) \longrightarrow$ **quotient**

$x + 2 \;\big|\; \cancel{2x^2} + 3x + 1$

$\cancel{2x^2} + 4x$

$(-) \quad (-)$

$-\cancel{x} + 1$

$-\cancel{x} - 2$

$(+) \quad (+)$

$+3 \longrightarrow$ **remainder**

43 $p(x) = x^3 - 7x^2 + 3x - 6$

$g(x) = x - 3$

$(x^2 - 4x - 9) \longrightarrow$ **quotient**

$x - 3 \;\big|\; \cancel{x^3} - 7x^2 + 3x - 6$

$\cancel{x^3} - 3x^2$

$(-) \quad (+)$

$\cancel{-4x^2} + 3x - 6$

$\cancel{-4x^2} + 12x$

$(+) \quad (-)$

$\cancel{-9x} - 6$

$\cancel{-9x} + 27$

$(+) \quad (-)$

$-33 \longrightarrow$ **remainder**

44 $p(x) = x^3 - 2x^2 - 5x - 2$

$g(x) = x - 5$

$(x^2 - x - 6) \longrightarrow$ **quotient**

$x - 1 \;\big|\; \cancel{x^3} - 2x^2 - 5x - 2$

$\cancel{x^3} - x^2$

$(-) \quad (+)$

$-\cancel{x^2} - 5x - 2$

$-\cancel{x^2} + x$

$(+) \quad (-)$

$-\cancel{6x} - 2$

$-\cancel{6x} + 6$

$(+) \quad (-)$

$-8 \longrightarrow$ **remainder**

45 $p(x) = x^3 - 2x^2 + 3x - 6$

$g(x) = x - 2$

$(x^2 + 3) \longrightarrow$ **quotient**

$x - 2 \;\big|\; \cancel{x^3} - \cancel{2x^2} + 3x - 6$

$\cancel{x^3} - \cancel{2x^2}$

$(-) \quad (+)$

$+\cancel{3x} - \cancel{6}$

$+\cancel{3x} - \cancel{6}$

$(-) \quad (+)$

$0 \longrightarrow$ **remainder**

46 $p(x) = 3x^3 + x^2 + 2x + 5$

$g(x) = 1 + 2x + x^2$

$(3x - 5) \longrightarrow$ **quotient**

$x^2 + 2x + 1 \;\big|\; \cancel{3x^3} + x^2 + 2x + 5$

$\cancel{3x^3} + 6x^2 + 3x$

$(-) \quad (-) \quad (-)$

$-\cancel{5x^2} - x + 5$

$-\cancel{5x^2} - 10x - 5$

$(+) \quad (+) \quad (+)$

$9x + 10 \longrightarrow$ **remainder**

47 $p(x) = x^3 - 3x^2 + 5x - 3$

$g(x) = x - 2$

$(x^2 - x + 7) \longrightarrow$ **quotient**

$x - 2 \;\big|\; \cancel{x^3} - 3x^2 + 5x - 3$

$\cancel{x^2} - 2x^2$

$(-) \quad (+)$

$-\cancel{x^2} + 5x - 3$

$-\cancel{x^2} - 2x$

$(+) \quad (+)$

$\cancel{7x} - 3$

$\cancel{7x} - 14$

$(-) \quad (+)$

$11 \longrightarrow$ **remainder**

UNIT : COORDINATE GEOMETRY

Find the distance between the following coordinate points :

48) (2, 3) & (6, 6)

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

$d = \sqrt{(6 - 2)^2 + (6 - 3)^2}$

$d = \sqrt{(4)^2 + (3)^2}$

$d = \sqrt{16 + 9}$

$d = \sqrt{25}$

$d = 5$

49) (2, 5) & (-3, -7)

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

$d = \sqrt{(-3 - 2)^2 + (-7 - 5)^2}$

$d = \sqrt{(-5)^2 + (-12)^2}$

$d = \sqrt{25 + 144}$

$d = \sqrt{169}$

$d = 13$

50) (8, 3) & (8, -7)

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

$d = \sqrt{(8 - 8)^2 + (-7 - 3)^2}$

$d = \sqrt{(0)^2 + (-10)^2}$

$d = \sqrt{0 + 100}$

$d = \sqrt{100}$

$d = 10$

51) (2, 8) & (6, 8)

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

$d = \sqrt{(6 - 2)^2 + (8 - 8)^2}$

$d = \sqrt{(4)^2 + (0)^2}$

$d = \sqrt{16 + 0}$

$d = \sqrt{16}$

$d = 4$

52) (3, 4) & (0, 0)

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

$d = \sqrt{(0 - 3)^2 + (0 - 4)^2}$

$d = \sqrt{(-3)^2 + (-4)^2}$

$d = \sqrt{9 + 16}$

$d = \sqrt{25}$

$d = 5$

53) (6, 9) & (18, 18)

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

$d = \sqrt{(18 - 6)^2 + (18 - 9)^2}$

$d = \sqrt{(12)^2 + (9)^2}$

$d = \sqrt{144 + 81}$

$d = \sqrt{225}$

$d = 15$

54) (5, 3) & (-13,7)

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

$d = \sqrt{(-13 - 5)^2 + (7 - 3)^2}$

$d = \sqrt{(-18)^2 + (4)^2}$

$d = \sqrt{324 + 16}$

$d = \sqrt{340}$

$d = 2\sqrt{85}$

55) (4, 6) & (12,12)

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

$d = \sqrt{(12 - 4)^2 + (12 - 6)^2}$

$d = \sqrt{(8)^2 + (6)^2}$

$d = \sqrt{64 + 36}$

$d = \sqrt{100}$

$d = 10$

56) (-2,-5) & (-2, 9)

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(-2 - (-2))^2 + (9 - (-2))^2}$

$d = \sqrt{(-2 + 2)^2 + (9 + 2)^2}$

$d = \sqrt{(0)^2 + (11)^2}$

$d = \sqrt{121}$

$d = 11$

57) (-3,5) & (0,1)

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

$d = \sqrt{(0 - (-3))^2 + (1 - 5)^2}$

$d = \sqrt{(3)^2 + (-4)^2}$

$d = \sqrt{9 + 16}$

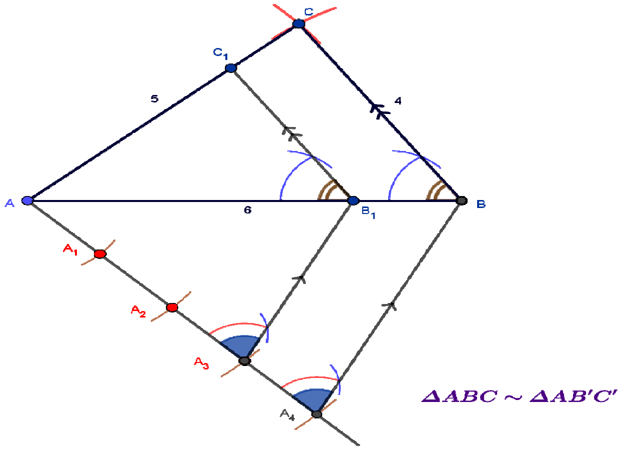
$d = \sqrt{25}$

$d = 5$

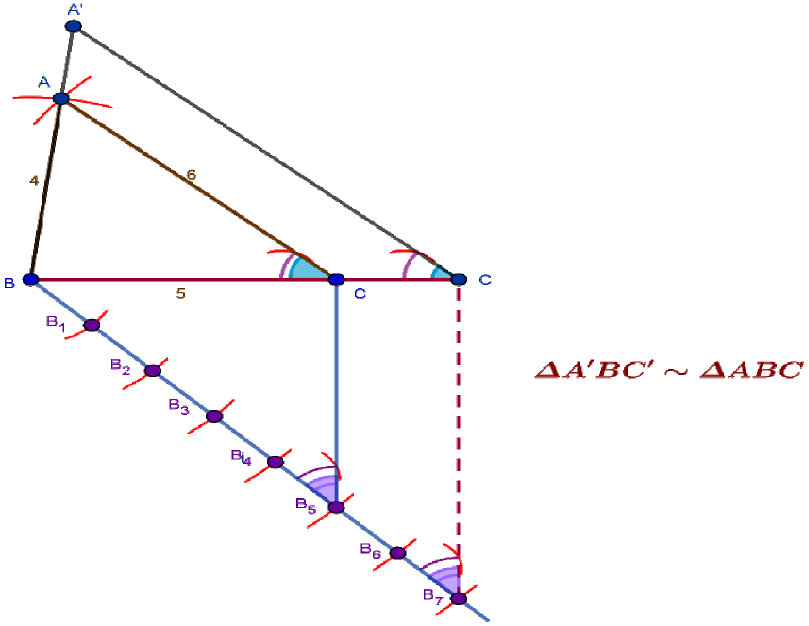
3 MARK QUESTIONS

UNIT : CONSTRUCTIONS

1) Draw a triangle ABC with sides of 4cm, 5cm & 6cm. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

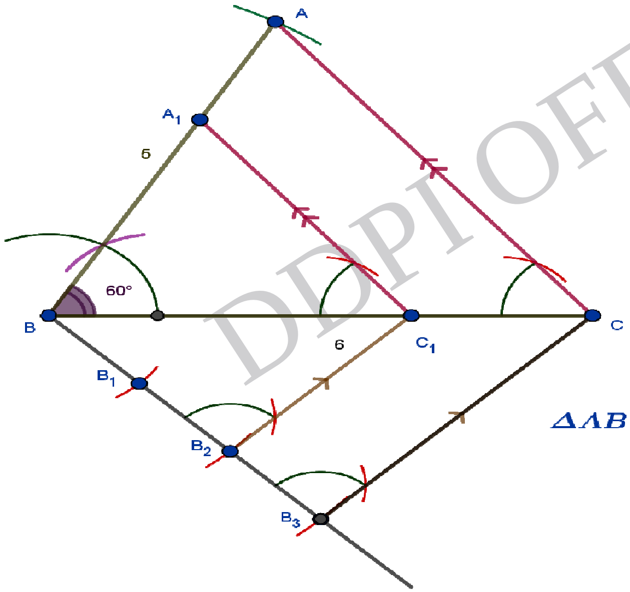


2) Draw a triangle ABC with sides of 4 cm, 5cm & 6cm. Then construct another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the triangle ABC.



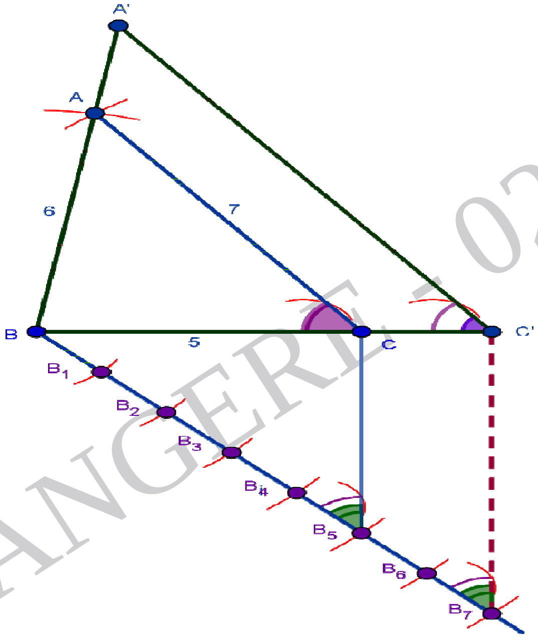
$\Delta A'BC' \sim \Delta ABC$

3) Draw a triangle ABC with sides BC = 6cm, AB = 5cm & ∠B =60°. Then construct another triangle whose sides are $\frac{2}{3}$of the corresponding sides of the triangle ABC.



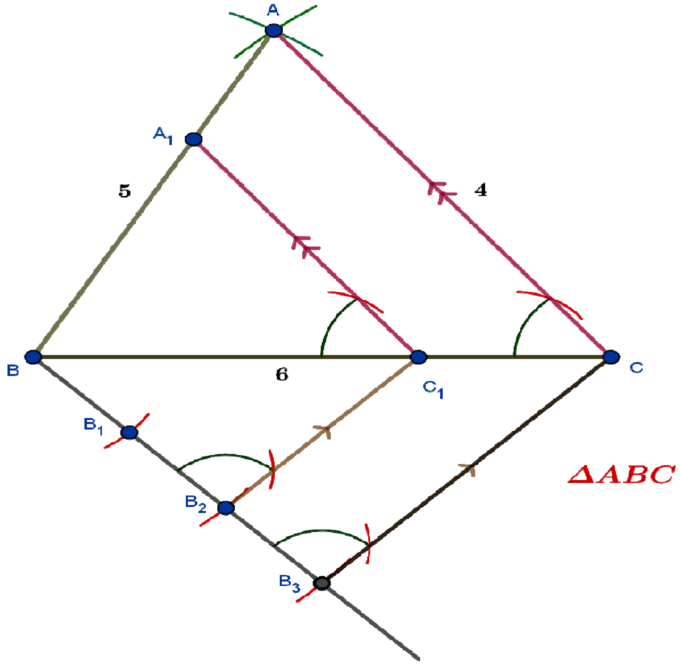
$\Delta ABC \sim \Delta A'BC'$

4) Draw a triangle ABC with sides of 6 cm, 5cm & 7cm. Then construct another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the triangle ABC.



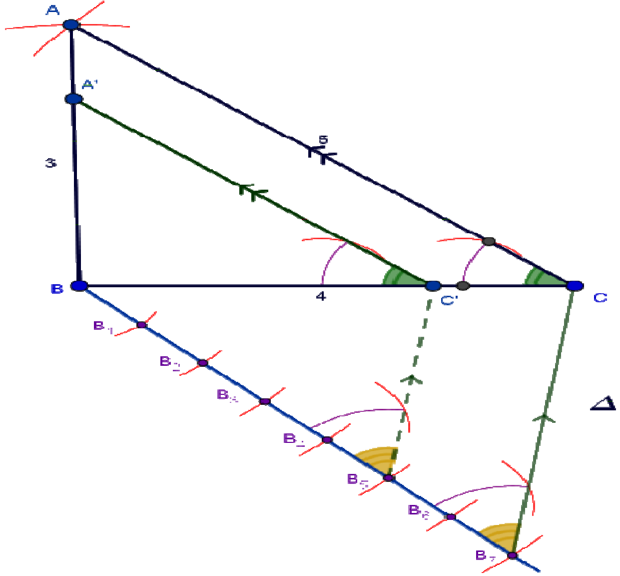
$\Delta A'BC' \sim \Delta ABC$

5) Draw a triangle ABC with sides BC=6cm, AB=5cm & AC= 4cm. Then construct another triangle whose sides are $\frac{2}{3}$ of the corresponding sides of the triangle ABC.



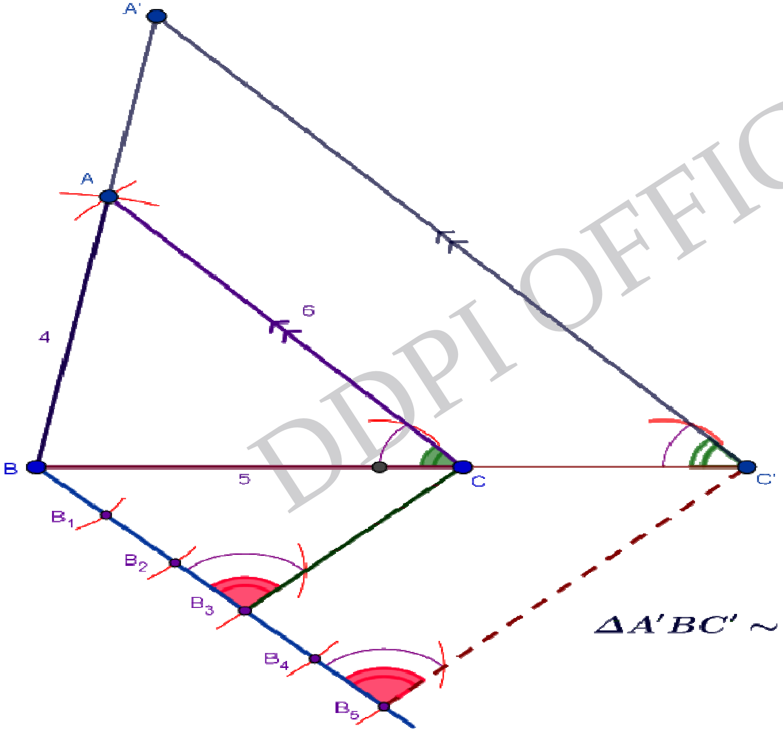
$\Delta ABC \sim \Delta A'BC'$

6) Draw a triangle ABC with sides of 3 cm, 4cm & 5cm. Then construct another triangle whose sides are $\frac{5}{7}$ of the corresponding sides of the triangle ABC.



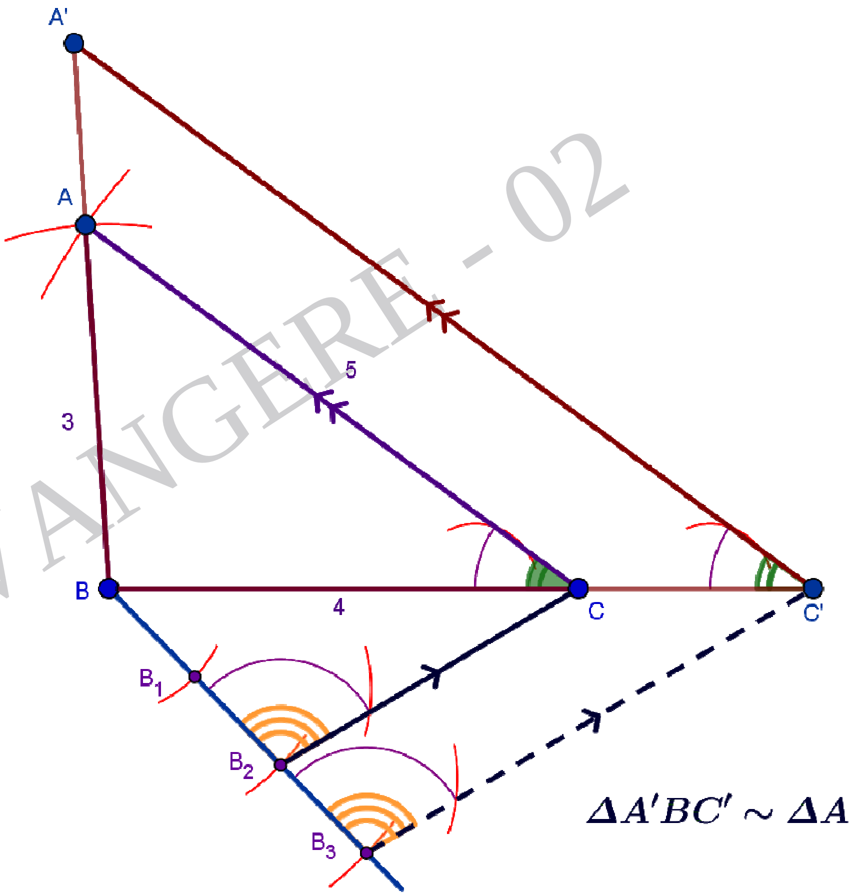
$\Delta A'BC' \sim \Delta ABC$

7) Draw a triangle ABC with sides of 4 cm, 5cm & 6cm. Then construct another triangle whose sides are $\frac{5}{3}$ of the corresponding sides of the triangle ABC.



$\Delta A'BC' \sim \Delta ABC$

8) Draw a triangle ABC with sides of 3cm, 4cm & 5cm. Then construct another triangle whose sides are $\frac{3}{2}$ of the corresponding sides of the triangle ABC.



$\Delta A'BC' \sim \Delta ABC$

UNIT : STATISTICS

01. Find the mean for the following distribution table.

C - I	f_i	x_i	$f_i x_i$
15 - 25	6	20	120
25 - 35	11	30	330
35 - 45	7	40	280
45 - 55	5	50	250
55 - 65	6	60	360
$\sum f_i = 35$		$\sum f_i x_i = 1340$	

$$\text{Mean} = \overline{X} = \frac{\sum fi\, xi}{\sum fi}$$

$$= \frac{1340}{35}$$

$$= 38.28$$

2. Find the median for the following distribution table.

C - I	f	cf
0 – 10	5	5
10 – 20	8	13
20 – 30	20	33
30 – 40	15	48
40 – 50	7	55
50 – 60	5	60
n = 60	$\frac{n}{2}$ = 30, h = 10	

$$\text{Median} = \ell + [\frac{\frac{n}{2} - cf}{f}] \times h$$

$$= 20 + [\frac{30 - 13}{20}] \times 10$$

$$= 20 + [\frac{17}{2}]$$

$$= 20 + 8.5$$

$$= 28.5$$

3. Find the mode for the following distribution table.

C - I	f	
0 – 20	10	
20 – 40	35	
40 – 60	52	$\longrightarrow f_0$
60 – 80	61	$\longrightarrow f_1$
80 – 100	38	$\longrightarrow f_2$
100 – 120	29	h = 20

$$\text{Mode} = \ell + [\frac{f1 - f0}{2f1 - f0 - f2}] \times h$$

$$= 60 + [\frac{61 - 52}{2(61) - 52 - 38}] \times 20$$

$$= 60 + [\frac{180}{32}]$$

$$= 60 + 5.625$$

$$= 65.625$$

4. Find the mean for the following distribution table.

C - I	f_i	x_i	f_ix_i
0 – 10	7	5	35
10 – 20	10	15	150
20 – 30	23	25	575
30 – 40	51	35	1785
40 – 50	6	45	270
50 – 60	3	55	165
$\sum f_i = 100$		$\sum f_i x_i = 2980$	

$$\text{Mean} = \overline{X} = \frac{\sum fi\ xi}{\sum fi}$$

$$= \frac{2980}{100}$$

$$= 29.8$$

5. Following table gives report of an environment awareness program. Find the mean of trees grown per house.

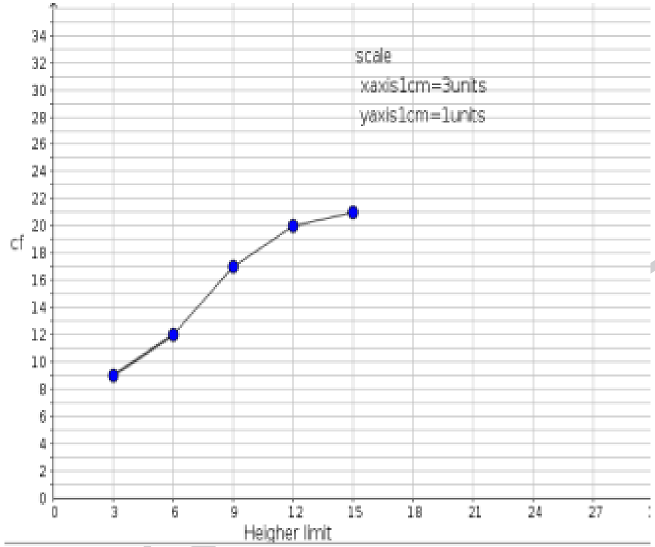
C - I	f_i	x_i	$f_i x_i$
0 – 2	1	1	1
2 - 4	2	3	6
4 – 6	1	5	5
6 - 8	5	7	35
8 – 10	6	9	54
$\sum f_i = 15$		$\sum f_i x_i = 101$	

$$\text{Mean} = \overline{X} = \frac{\sum fi\ xi}{\sum fi}$$

$$= \frac{101}{15}$$

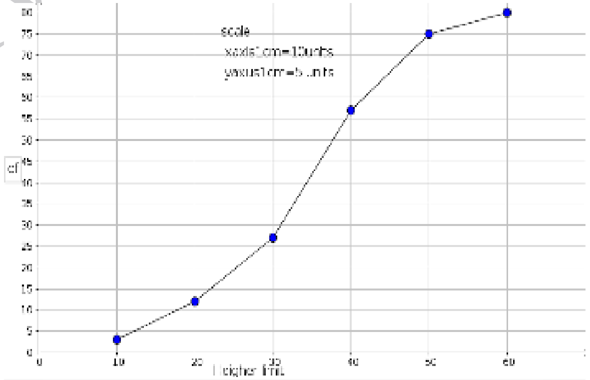
$$= 6.734$$

6. Draw less than type of Ogive for the given data



C - I	f	cf	(x, y)
0 - 3	9	9	(3, 9)
3 - 6	3	12	(6, 12)
6 - 9	5	17	(9, 17)
9 - 12	3	20	(12, 20)
12- 15	1	21	(15, 21)
	21		

7. The following table gives the distribution of daily wages of its employees. Find the daily wages of employees. Draw less than type of Ogive for the given data.



Daily wage (in Rs)	No. of emp	cf	(x, y)
0 - 10	3	3	(10, 3)
10 - 20	9	12	(20, 12)
20 - 30	15	27	(30, 27)
30 - 40	30	57	(40, 57)
40 - 50	18	75	(50, 75)
50 - 60	5	80	(60, 80)
	80		

8. Find the median for the following distribution table.

C - I	f	cf
1 – 4	6	5
4 – 7	30	36
7 – 10	40	76
10 – 13	16	92
13 – 16	4	96
16 – 19	4	100
n = 100	$\frac{n}{2}$ = 50, h = 10	

$$\text{Median} = \ell + [\frac{\frac{n}{2} - cf}{f}] \times h$$

$$= 7 + [\frac{50 - 36}{40}] \times 10$$

$$= 7 + [\frac{14}{4}]$$

$$= 7 + 3.5$$

$$= 8.5$$

9. Find the median for the following distribution table.

C - I	f	cf
10 - 25	2	2
25 - 40	7	9
40 - 55	6	15
55 - 70	6	21
40 - 50	6	27
50 - 60	3	30
n = 30, $\frac{n}{2} = \frac{30}{2}$ = 15, h = 15		

$$\text{Median} = \ell + \left[\frac{\frac{n}{2} - cf}{f} \right] \text{x h}$$

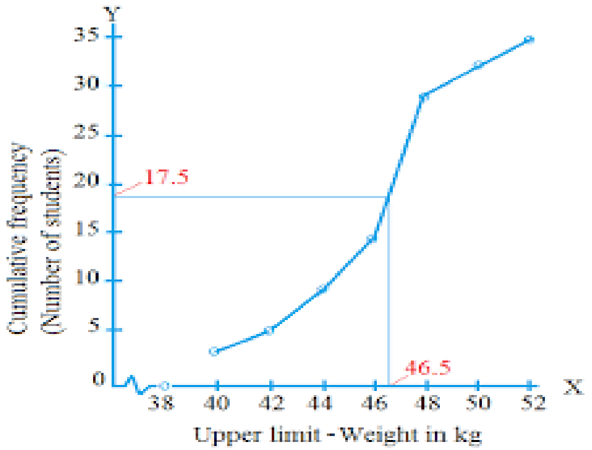
$$= 40 + \left[\frac{15-9}{6} \right] \text{x } 15$$

$$= 40 + \left[\frac{6}{6} \right] \text{x } 15$$

$$= 40 + 15$$

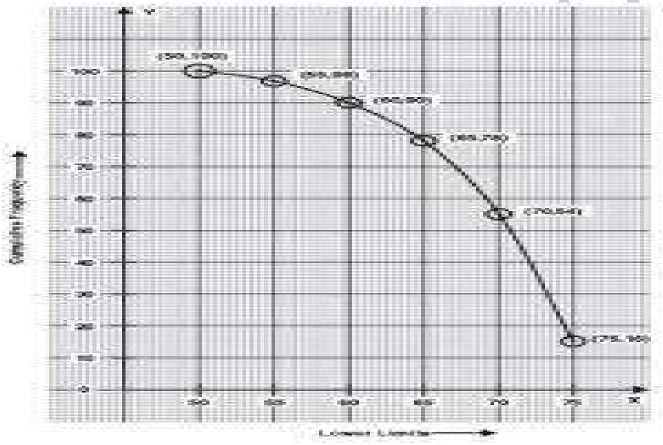
$$= 55$$

10. The following table gives the weights of the 35 students during medical examination. Draw less than type of Ogive for the data.



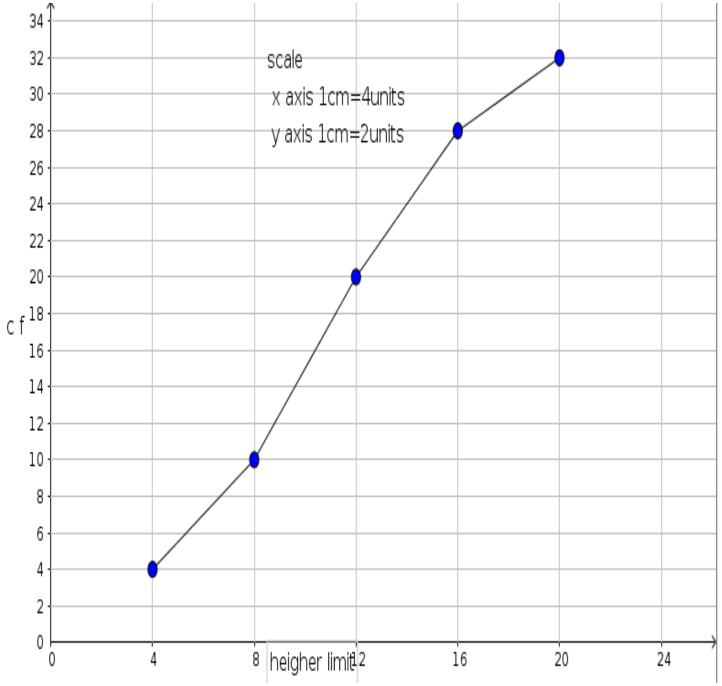
Weight (in kg)	No. of stds
less than 38	0
less than 40	3
less than 42	5
less than 44	9
less than 46	14
less than 48	28
less than 50	32
less than 52	35

11. The following table gives the yield of wheat per hectare in 100 fields.Draw more than type Ogive.



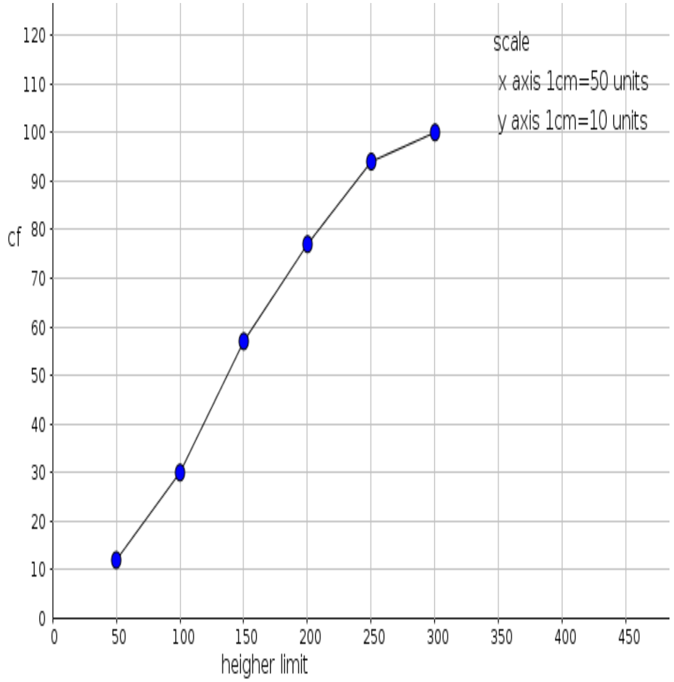
Yeilds	No. of yeilds	cf	(x, y)
50 - 55	2	100	(50, 100)
55 - 60	8	98	(55, 98)
60 - 65	12	90	(60, 90)
65 - 70	24	78	(65, 78)
70 - 75	38	54	(70, 54)
75 - 80	16	16	(75, 16)
	100		

12. Draw less than type of Ogive for the below data.



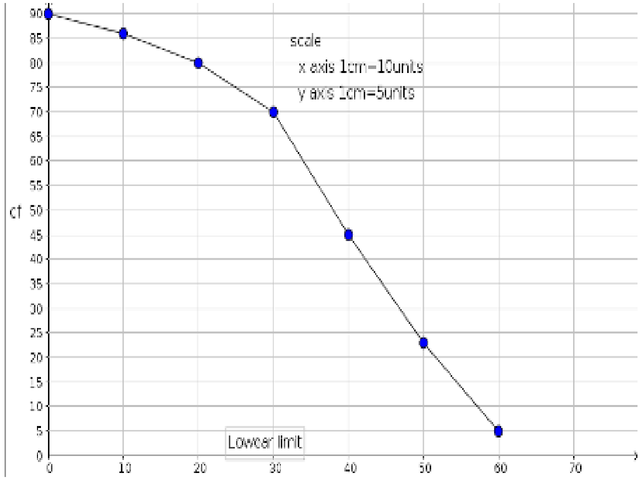
Marks	No. of stds	cf	(x, y)
0 - 4	4	4	(4, 4)
4 - 8	6	10	(8, 10)
8 - 12	10	20	(12, 20)
12 - 16	8	28	(16, 28)
16 - 20	4	32	(20, 32)
	32		

13. Draw less than type of Ogive for the below data.



C.I.	f	cf	(x, y)
0 - 50	12	12	(50, 12)
50 - 100	18	30	(100, 30)
100 - 150	27	57	(150, 57)
150 - 200	20	77	(200, 77)
200 - 250	17	94	(250, 94)
250 - 300	6	100	(300,100)
	100		

14) Draw more than type of Ogive for the data.



Marks	No. Of stds	cf	(x,y)
0 - 10	4	90	(0, 90)
10 - 20	6	86	(10, 86)
20 - 30	10	80	(20, 80)
30 - 40	25	70	(30, 70)
40 - 50	22	45	(40, 45)
50 - 60	18	23	(50, 23)
60 - 70	5	5	(60, 5)
	90		

15) Find the median of the data collected by the survey report heights of 50 girls.

Height (in cm)	No. of students (f)	cf
135 - 140	5	5
140 - 145	8	13
145 - 150	19	32
150 - 155	12	44
155 - 160	14	58
160 - 165	2	60
n = 30, $\frac{n}{2} = \frac{60}{2}$ = 30, h = 5		

$$\boxed{\text{Median} = \ell + \left[\frac{\frac{n}{2} - cf}{f} \right] \text{x h}}$$

$$= 145 + \left[\frac{30 - 13}{19}\right] \text{x } 5$$

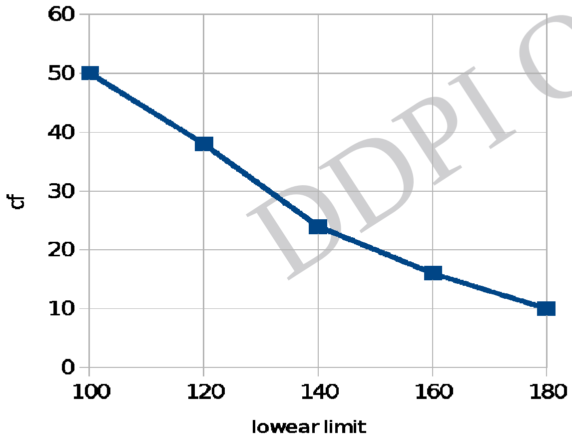
$$= 145 + \left[\frac{17}{19}\right] \text{x } 5$$

$$= 145 + \left[\frac{85}{19}\right]$$

$$= 145 + 4.47$$

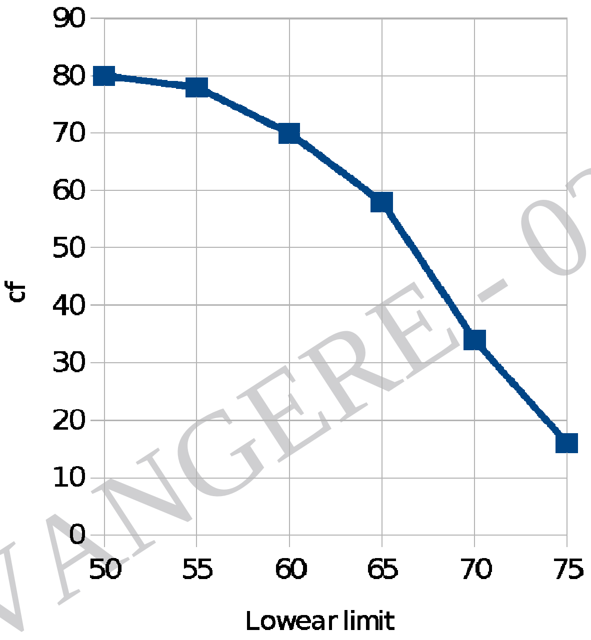
$$= 149.47$$

16) Draw more than type of Ogive for the data



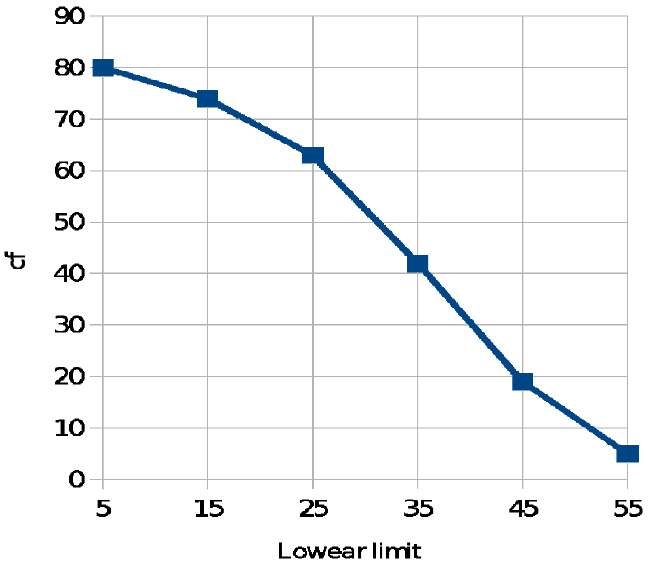
C.I.	f	cf	(x, y)
100 - 120	12	50	(100, 50)
120 - 140	14	38	(120, 38)
140 - 160	8	24	(140, 24)
160 - 180	6	16	(160, 16)
180 - 200	10	10	(180, 10)
	50		

17) Draw more than type of Ogive for the data



C.I	f	cf	(x, y)
50 - 55	2	80	(50, 80)
55 - 60	8	78	(55, 78)
60 - 65	12	70	(60, 70)
65 - 70	24	58	(65, 58)
70 - 75	18	34	(70, 34)
75 - 80	16	16	(75, 16)
	80		

18) Draw more than type of Ogive for the data.

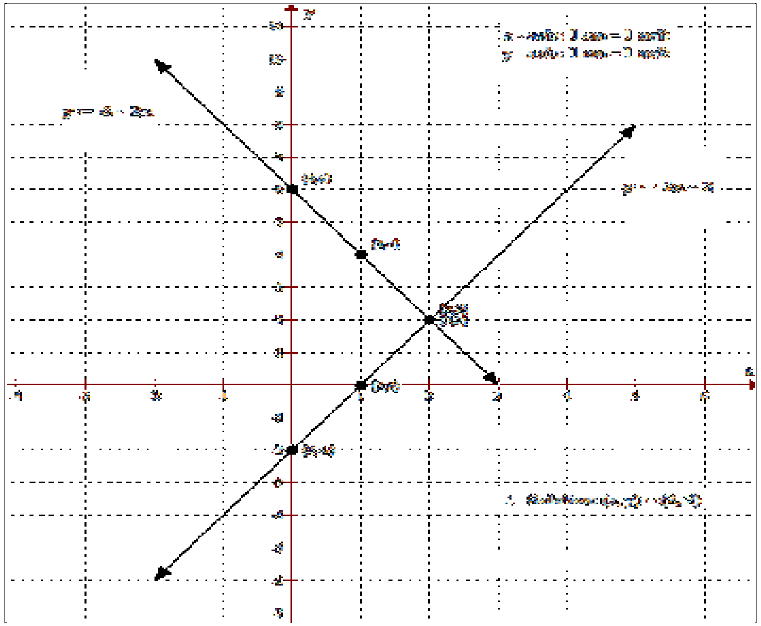


C.I.	f	cf	(x, y)
5 - 15	6	80	(5, 80)
15 - 25	11	74	(15, 74)
25 - 35	21	63	(25, 63)
35 - 45	23	42	(35, 42)
45 - 55	14	19	(45, 19)
55 - 65	5	5	(55, 5)
	80		

4 MARKS QUESTION

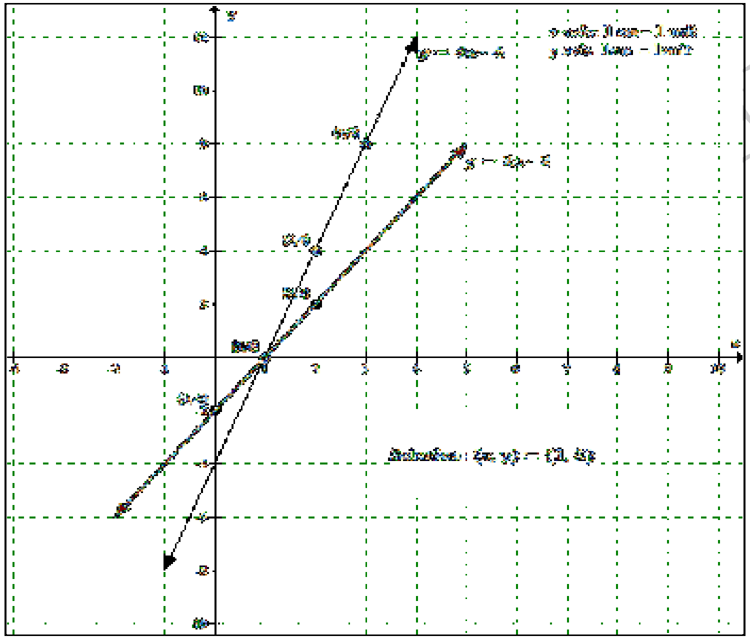
UNIT : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

A) Solve graphically : y = 6 - 2x and y = 2x – 2



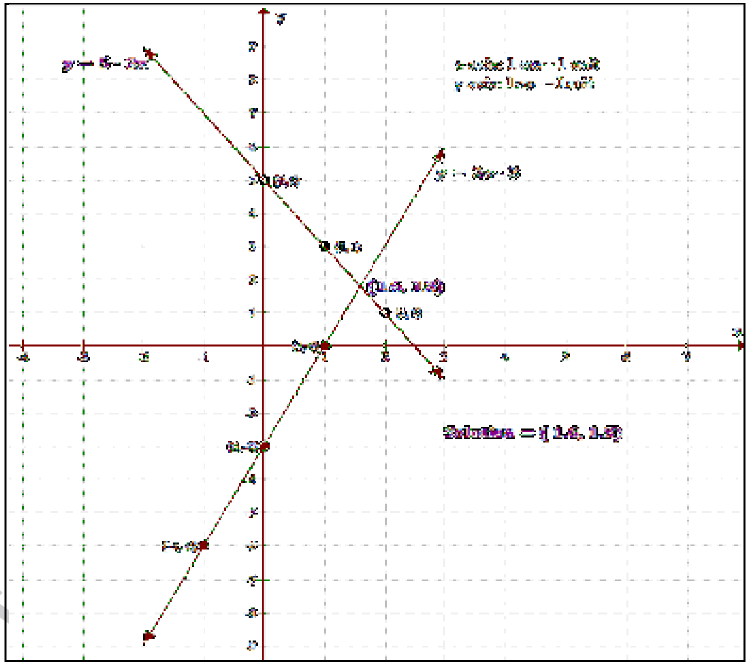
x	0	1	2
y	6	4	2
(x, y)	(0,6)	(1,4)	(2,2)
x	0	1	2
y	-2	0	2
(x, y)	0,-2)	(1,0)	(2,2)

B) Solve graphically : y = 2x - 2 and y = 4x - 4



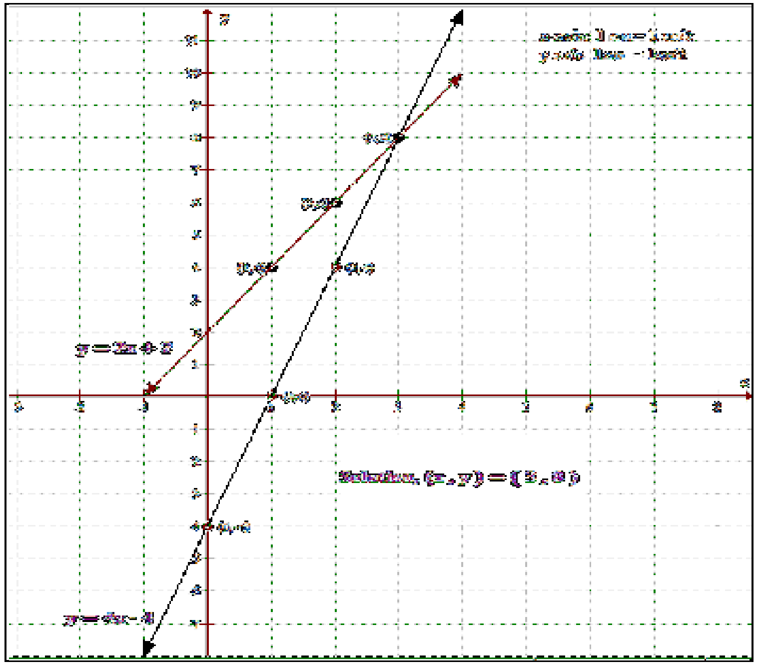
x	0	1	2
y	-2	0	2
(x, y)	(0,-2)	(1,0)	(2,2)
x	1	2	3
y	0	4	8
(x, y)	(1,0)	(2,4)	(3,8)

C) Solve graphically : y = 3x - 3 and y = 5 - 2x



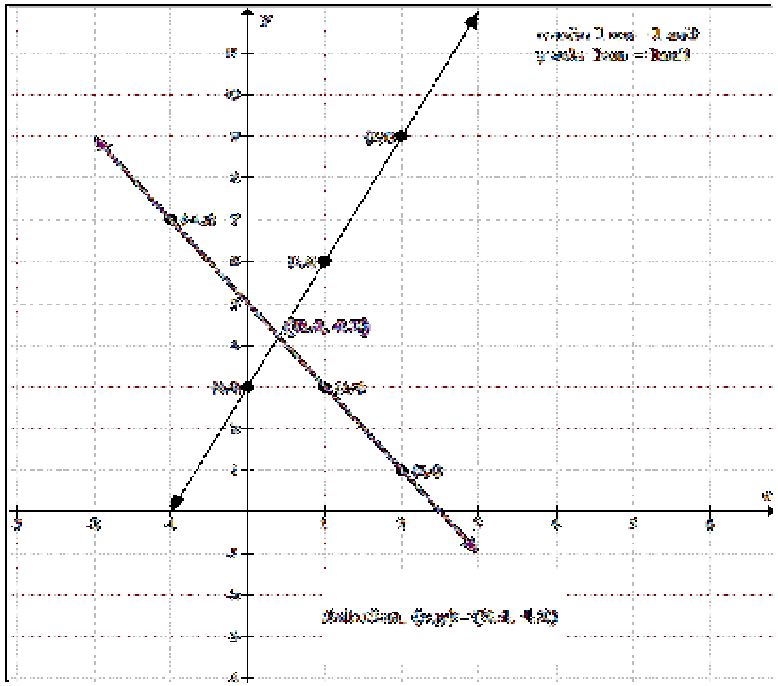
x	1	2	3
y	4	6	8
(x, y)	(1,4)	(2,6)	(3,8)
x	0	1	2
y	-4	0	4
(x, y)	(0,-4)	(1,0)	(2,4)

D) Solve graphically : y = 2x + 2 and y = 4x – 4



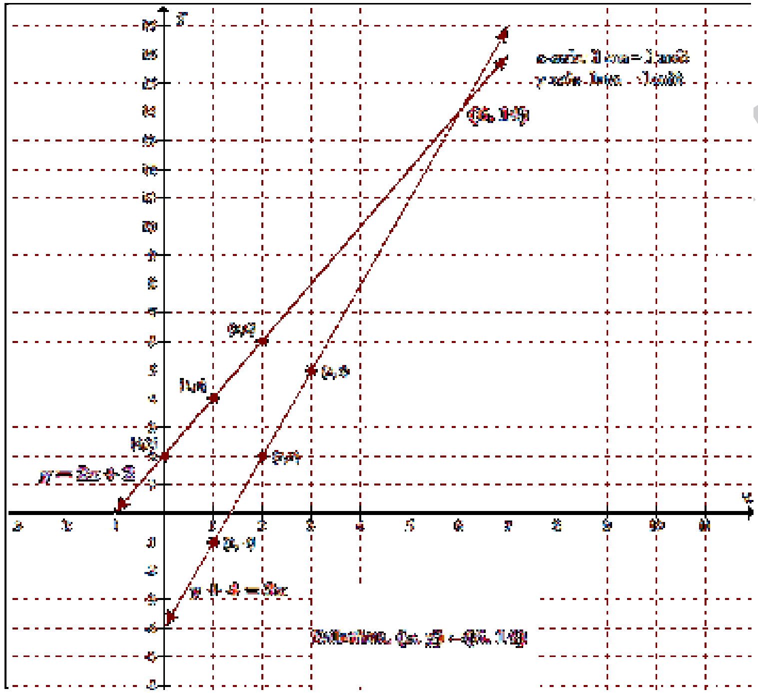
x	0	1	-1
y	-3	0	-6
(x, y)	(0,-3)	(1,0)	(-1,-6)
x	0	1	2
y	5	3	1
(x, y)	(0,5)	(1,3)	(2, 1)

E) Solve graphically : y = 3x + 3 and y = 5 - 2x



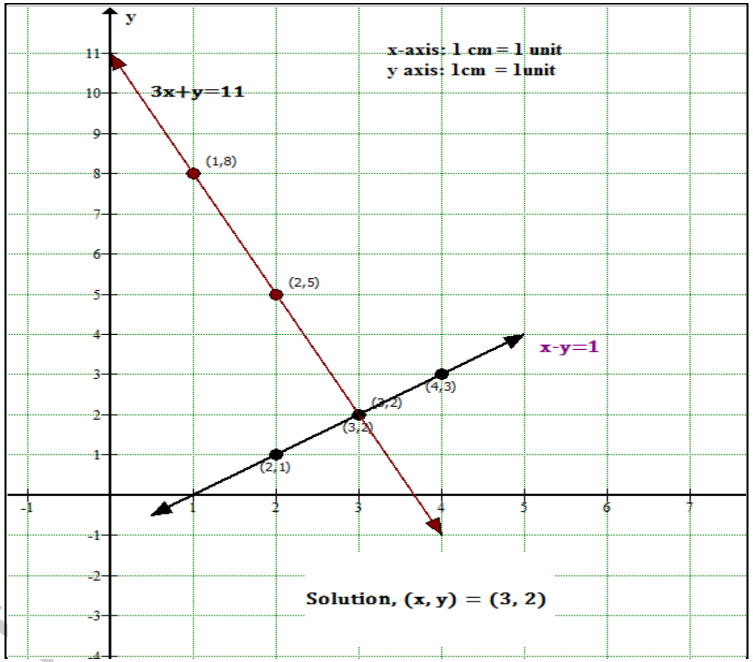
x	0	1	2
y	3	6	9
(x,y)	(0,3)	(1,6)	(2,9)
x	1	2	-1
y	3	1	7
(x,y)	(1,3)	(2,1)	(-1,7)

F) Solve graphically : y = 2x + 2 and y + 4 = 3x



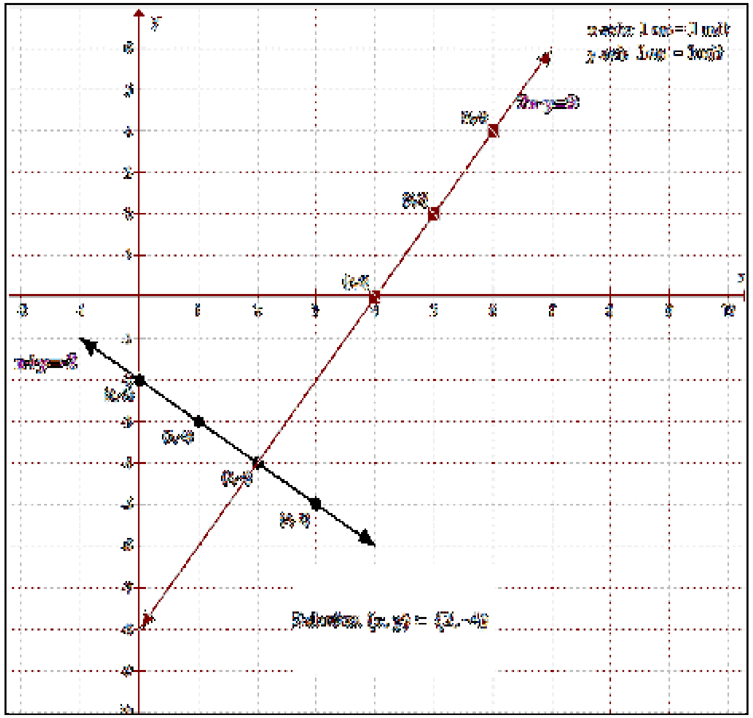
x	0	1	2
y	2	4	6
(x,y)	(0,2)	(1,4)	(2,6)
x	1	2	3
y	-1	2	5
(x,y)	(1,-1)	(2,2)	(3,5)

G) Solve graphically : 3x + y = 11 and x – y = 1



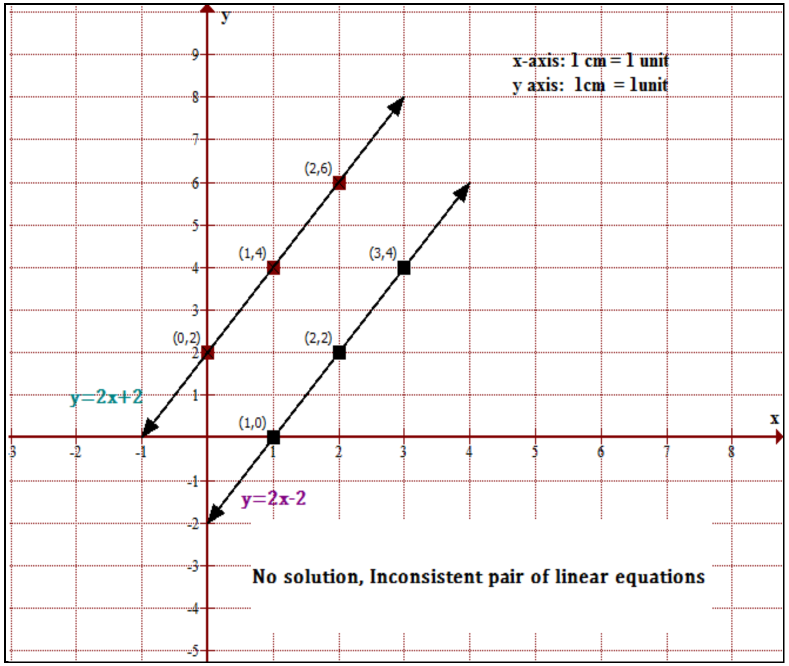
x	1	2	3
y	8	5	2
(x, y)	(1,8)	(2,5)	(3,2)
x	2	3	4
y	1	2	3
(x, y)	(2,1)	(3,2)	(4,3)

H) Solve graphically : x + y = -2 and 2x – y = 8



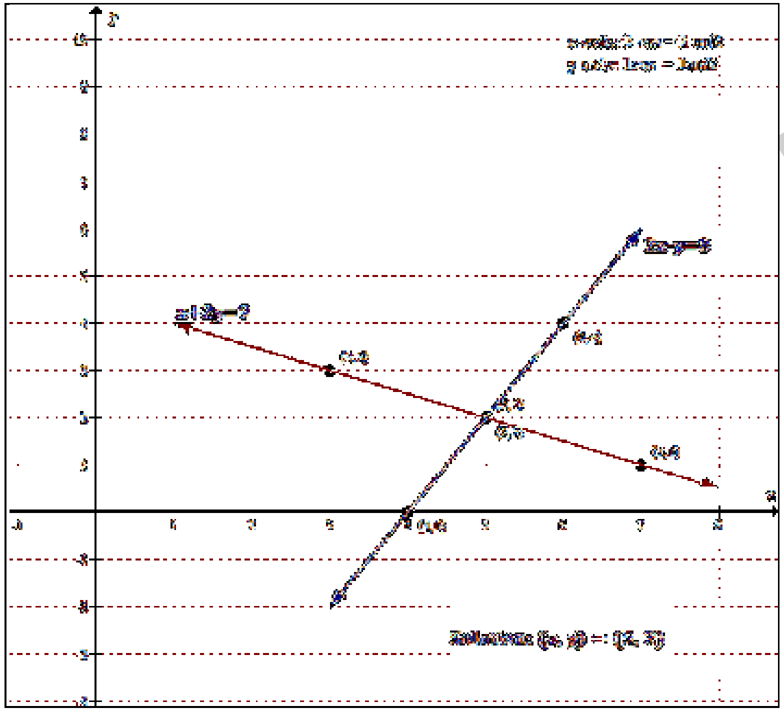
x	0	1	3
y	-2	-3	-5
(x,y)	(0,-2)	(1,-3)	(3,-5)
x	4	5	6
y	0	2	4
(x,y)	(4,0)	(5,2)	(6,4)

I) Solve graphically : y = 2x - 2 and y = 2x + 2



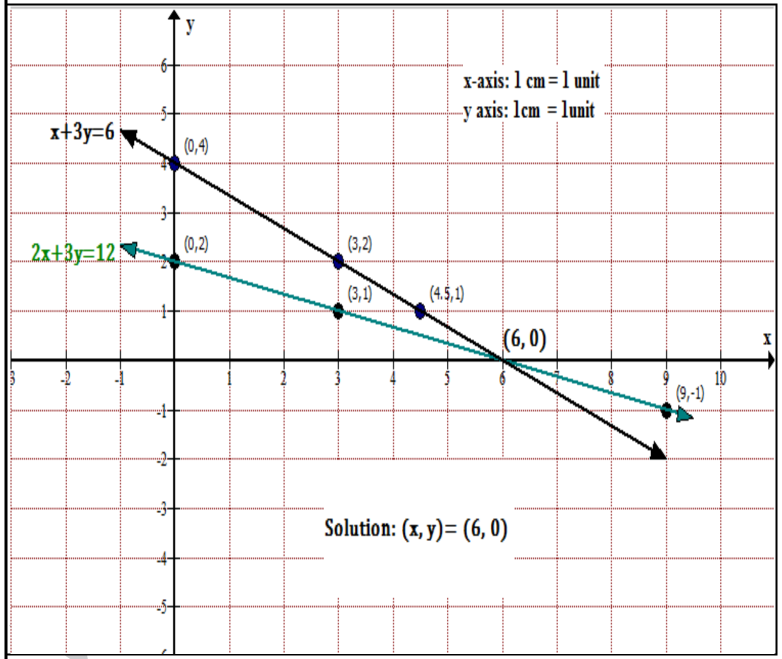
x	1	2	3
y	0	2	4
(x,y)	(1,0)	(2,2)	(3,4)
x	0	1	2
y	2	4	6
(x,y)	(0,2)	(1,4)	(2,6)

J) Solve graphically : x + 2y = 9 and 2x – y = 8



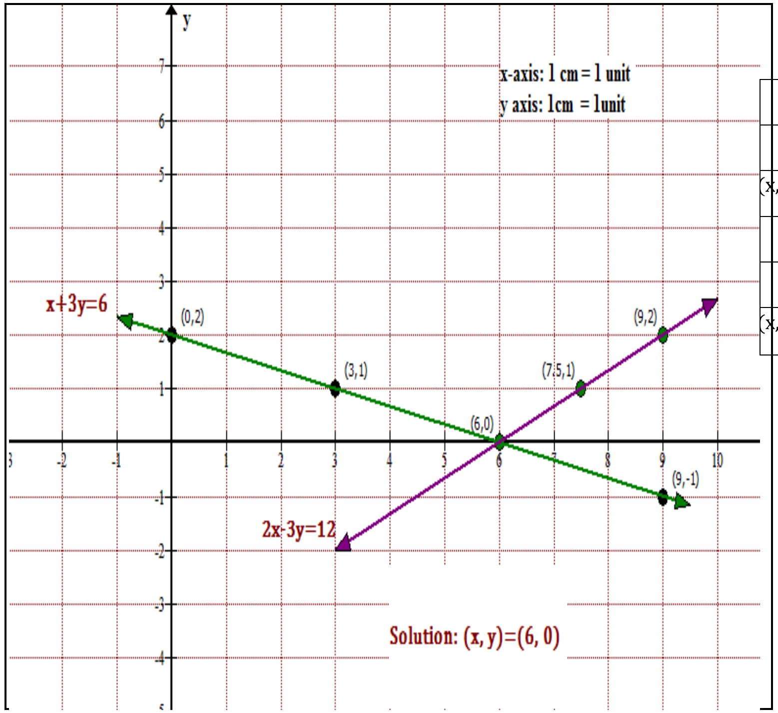
x	7	5	3
y	1	2	3
(x,y)	(1, 7)	(5,2)	(3,3)
x	4	5	6
y	0	2	4
(x,y)	(0,4)	(5,2)	(6,4)

K) Solve graphically : x + 3y = 6 and 2x + 3y = 12



x	3	0	9
y	1	2	-1
(x, y)	(3, 1)	(0, 2)	(3,3)
x	4.5	3	0
y	1	2	4
(x, y)	.5, 1)	(3, 2)	(0, 4)

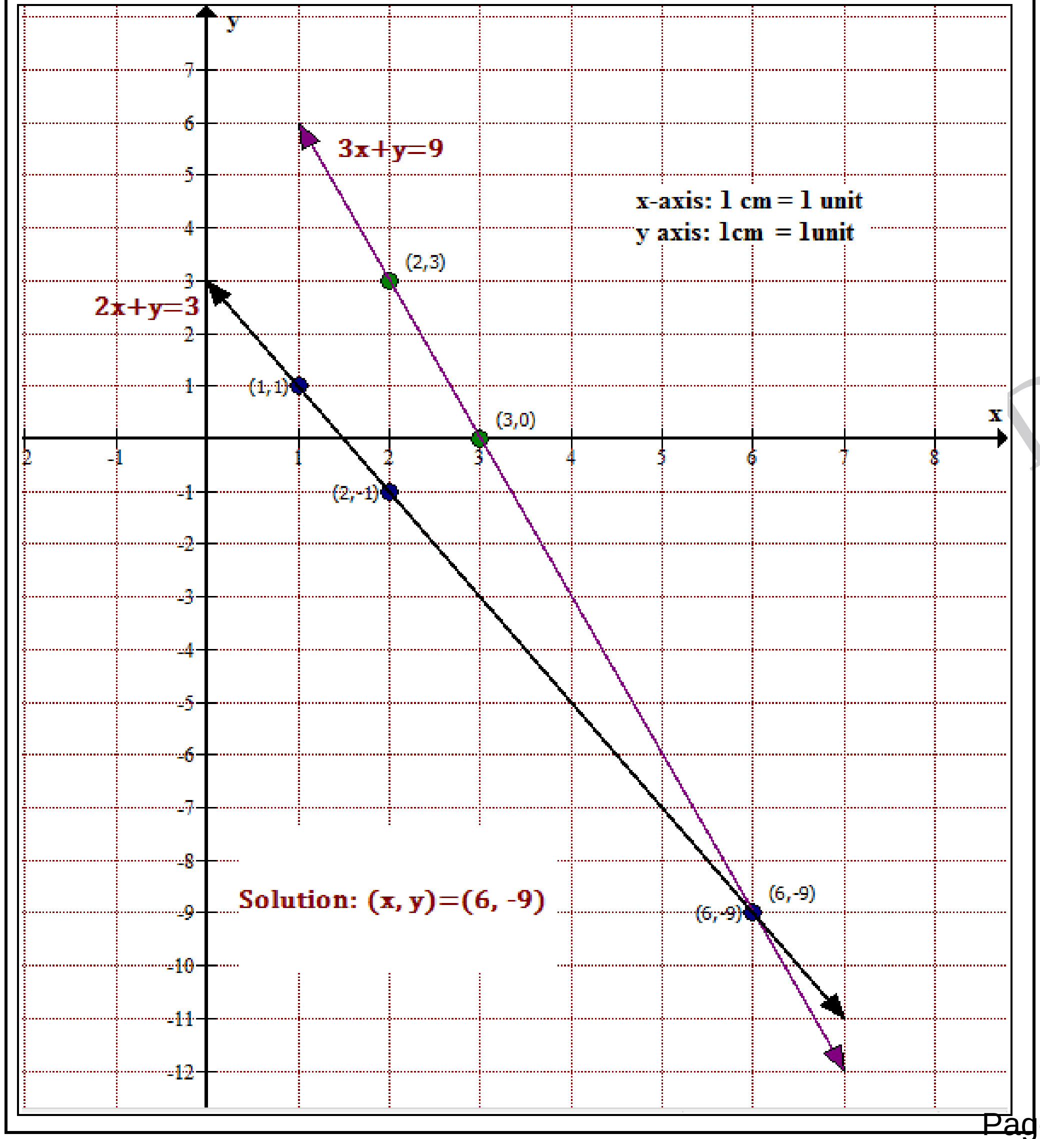
L) Solve graphically : x + 3y = 6 and 2x - 3y = 12



x	3	0	9
y	1	2	-1
(x, y)	(3,1)	(0,2)	(9,-1)
x	6	7.5	9
y	0	1	2
(x, y)	(6,0)	(7.5,1)	(9,2)

M) Solve graphically : $3x + y = 9$ and $2x + y = 3$

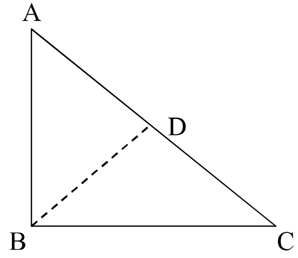
x	2	3	6
y	3	0	-9
(x, y)	(2, 3)	(3, 0)	(6, -9)
x	1	2	6
y	1	-1	-9
(x, y)	(1, 1)	(2, -1)	(6,-9)



UNIT : TRIANGLES

1. State and prove Pythagoras theorem

Statement : In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.



Data : In Δ ABC, ∠ABC = 90^0

To Prove : $AC^2 = AB^2 + BC^2$

Construction : BD ⊥ AC

Proof : In Δ ADB and ABC

∠ADB = ∠ABC = 90^0	(Data and Construction)
∠BAD = ∠BAC	(Common angle)
AB = AB	(Common side)
Δ ADB ≅ Δ ABC	(AA similarity criterian)

$\frac{AD}{AB} = \frac{AB}{AC}$

$AD.AC = AB^2$ ....(1)

In Δ BDC and Δ ABC

∠BDC = ∠ABC	(Data and Construction)
∠DCB = ∠ACB	(Common angle)
Δ BDC ≅ Δ ABC	(A - A similarity criterian)

$\frac{DC}{BC} = \frac{BC}{AC}$

$DC.AC = BC^2$.....................(2)

By adding (1) and (2)

$AD.AC + DC.AC = AB^2 + BC^2$

$AC (AD + DC) = AB^2 + BC^2$ [AD + DC = AC]

$AC.AC = AB^2 + BC^2$

$AC^2 = AB^2 + BC^2$

2. State and prove converse of Pythagoras theorem.

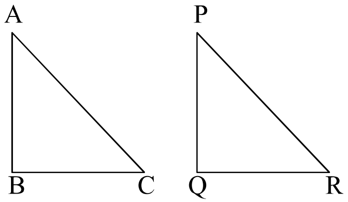
Statement: “In a triangle, if the square of one side of a triangle is equal to the sum of squares of the other two sides then the angle opposite to the first side is a right angle.”

Data : In $\Delta ABC, AC^2 = AB^2 + BC^2$

To Prove : $\angle ABC = 90^{\cdot}$

Construction : Construct ΔPQR, right angled at Q

Such that PQ = AB , And QR = BC



Proof: In ΔPQR

$PR^2 = PQ^2 + QR^2$ (By Pythagoras theorem as $\angle Q=90^0$)

$PR^2 = AB^2 + BC^2$ ...... (1) (By Construction)

$AC^2 = AB^2 + BC^2$...... (2) (By Data)

AC = PR ..... (3) (From (1) And (2))

Now, In ΔABC and ΔPQR

AB = PQ (By Construction)

BC = QR (By construction)

AC = PR (Proved in (3) above)

So, $\Delta ABC \cong \Delta PQR$ (By SSS Congruence)

$\angle B = \angle Q$ (By CPCT)

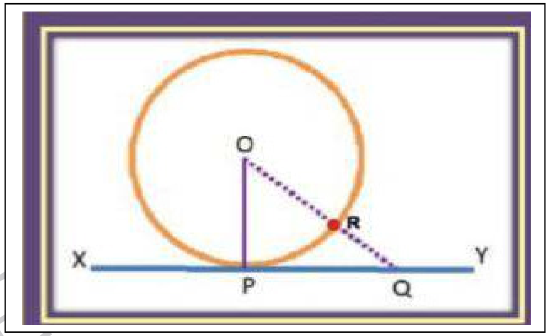
But, $\angle Q=90^{0.}$ (By construction)

So, $\angle B=90^{0.}$

Hence proved.

CIRCLE THEORM - 1

Statement : The tangent at any point of a circle is perpendicular to the radius through the point of contact.



Data : XY is tangent

O is center of circle

P is point of contact

OP is radius of the circle

To Prove : OP ⊥ XY

Construction : Make a point Q on XY, join OP & OQ

OQ intersect the circle at point R

Proof : Compare OQ & OR , OQ > OP

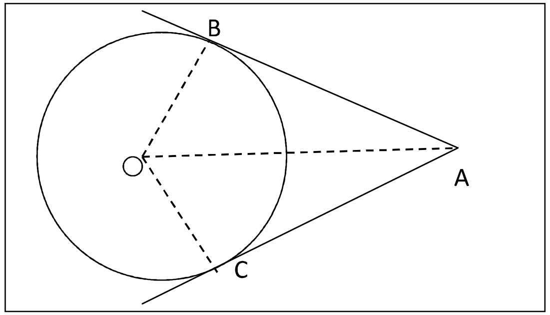
But, OP = OR (Radii of the same circle)

OQ > OP (By construction)

OP is the shorter distance to XY

CIRCLE THEORM - 2

Statement : The length of tangents drawn from an external point to a circle are equal .



Data : AB &AC Are tangents

O is center of circle

A is an external point

To Prove : AB = AC

Construction : Join OA ,OC & OB

Proof : In ΔOBA And ΔOCA

OB = OC (Radii of the same circle)

OA = OA (Common side)

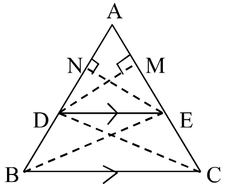
$\angle OBA = \angle OCA = 90^0$ (Radius ⊥ to tangents)

So, $\Delta OBA \cong \Delta OCA$ (RHS postulate)

∴ AB=AC

THALES THEOREM

STATEMENT : If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.



DATA : In ΔABC, DE∥BC.

TO PROVE : $\frac{AD}{DB} = \frac{AE}{EC}$

CONSTRUCTION : To join D, C & E, B. Draw EN ⊥ AB, DM ⊥ AC.

PROOF : In ΔADE & ΔBDE

$$\frac{Area\ of\ \Delta ADE}{Area\ of\ \Delta BDE} = \frac{\frac{1}{2} X\ AD\ X\ EN}{\frac{1}{2} X\ DB\ X\ EN}$$

$$= \frac{AD}{DB} \text{……….(1)}$$

In ΔADE & ΔCDE

$$\frac{Area\ of\ \Delta ADE}{Area\ of\ \Delta CDE} = \frac{\frac{1}{2} X\ AE\ X\ DM}{\frac{1}{2} X\ EC\ X\ DM}$$

$$= \frac{AE}{EC} \text{……….(2)}$$

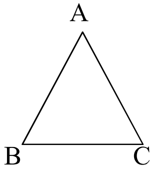
From (1) & (2) , ∴ $\frac{AD}{DB} = \frac{AE}{EC}$

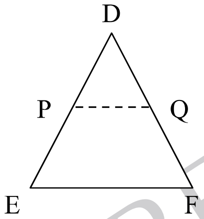
$\because Area\ of \Delta BDE = Area\ of \Delta CDE$

In ΔBDE & ΔCDE are on the same base BC and between the same parallel BC & DE

A – A CRITERIA THE0REM

STATEMENT : If in two Δ ^{les}, corresponding angles are equal, then their corresponding sides are in the same proportion.





DATA : In ΔABC & ΔDEF

$\angle A = \angle D, \angle B = \angle E$ & $\angle C = \angle F$

TO PROVE : $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$

CONSTRUCTION **:** To draw PQ ∥ EF

DP = AB, BC = PQ & AC = DQ

PROOF **:** In ΔABC & ΔDPQ

AB = DP & AC = DQ [∵ Construction]

$\angle A = \angle D$ [∵ DATA]

∴ ΔABC ≅ ΔDPQ [∵ S.A.S. postulate]

∴ $\angle B = \angle P$ [∵ corresponding angles in similar triangles]

But, $\angle B = \angle E$ [∵ DATA]

⇒ $\angle P = \angle E$

∴ PQ ∥ EF

∴ $\frac{DP}{DE} = \frac{PQ}{EF} = \frac{QD}{FD}$

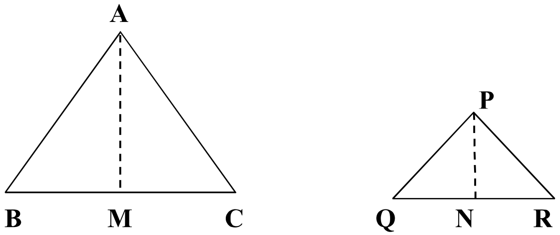
[∵Thales theorem]

∴ $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$

∵ ΔABC ≅ ΔDEF

AREA OF TRIANGLES THEOREM

STATEMENT : The ratio of the areas of two similar triangles is equal to the square of ratio of their corresponding sides



DATA : In ΔABC ~ ΔPQR

$$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{CA}{RP}$$

TO PROVE: $\frac{Area\ of\ \Delta ABC}{Area\ of\ \Delta PQR} = \frac{BC^2}{QR^2}$

CONSTRUCTION : Draw AM ⊥ BC & PN ⊥ QR.

PROOF : In ΔAMB & ΔPNQ

$\angle B = \angle Q = 90^0$ [∵ DATA]

$\angle AMB = \angle PNQ = 90^0$ [∵ Construction]

AB = PQ

ΔAMB ~ ΔPNQ [A – A Criteria]

$\Rightarrow \frac{AM}{PN} = \frac{AB}{PQ}$ But, $\frac{BC}{QR} = \frac{AB}{PQ}$

$\therefore \frac{AM}{PN} = \frac{BC}{QR}$

$$\therefore \frac{Area\ of\ \Delta ABC}{Area\ of\ \Delta PQR} = \frac{\cancel{1/2}\ X\ BC\ X\ AM}{\cancel{1/2}\ X\ QR\ X\ PN}$$

$$\therefore \frac{Area\ of\ \Delta ABC}{Area\ of\ \Delta PQR} = \frac{BC^2}{QR^2} \quad [\because \frac{AM}{PN} = \frac{BC}{QR}]$$

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