



ಜಿಲ್ಲಾಡಳಿತ ದಾವಣಗೆರೆ

ಕನಾಟಕ ಸರ್ಕಾರ

ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ತ ದಾವಣಗೆರೆ

ಉಪನಿರ್ದೇಶಕರ ಕಬ್ಬೀರಿ, ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ದಾವಣಗೆರೆ.  
ದಾವಣಗೆರೆ ಜಿಲ್ಲೆ.

ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ ಗಣ್ಯತ ಕಲಿಕಾ ಮಾರ್ಗದರ್ಶಿ : 2019 - 20

## ವಿಶ್ವಾಸ ವ್ಯಾಧಿ

(ಇಂಗ್ಲೀಷ್ ಮಾರ್ಥಿಲ್)

: ಮಾರ್ಗದರ್ಶನ :

ಶ್ರೀಮತಿ ಪದ್ಮ ಬಸವಂತಪ್ಪ  
ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಹಣಾರ್ಥಿಕಾರಿಗಳು  
ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ತ  
ದಾವಣಗೆರೆ

ಶ್ರೀ ಮಹಾಂತೇಶ್ ಬೀಳಗಿ  
ಜಿಲ್ಲಾರ್ಥಿಕಾರಿಗಳು  
ದಾವಣಗೆರೆ

ಶ್ರೀ ಲಿಂಗರಾಜ್ ಹೆಚ್ ಕೆ  
ಪ್ರಾಂಶುಪಾಲರು ಹಾಗೂ ಪದನಿಮಿತ್ತ  
ಉಪನಿರ್ದೇಶಕರು (ಅಭಿವೃದ್ಧಿ)  
ಡಯಟ್, ದಾವಣಗೆರೆ

ಶ್ರೀ ಸಿ ಆರ್ ಪರಮೇಶ್ವರಪ್ಪ  
ಉಪನಿರ್ದೇಶಕರು (ಆಡಳಿತ)  
ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ  
ದಾವಣಗೆರೆ

ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ, ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ದಾವಣಗೆರೆ ಜಿಲ್ಲೆ.

ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ ಗಣೀತ ಕಲಿಕಾ ಮಾರ್ಗದರ್ಶಿ : 2019 - 20

## ವಿಶ್ವಾಸ ವ್ಯಾಧಿ

(ಇಂಗ್ಲಿಷ್ ಮಾಡ್ಯಮ)

: ಸಲಹೆ :

ಶ್ರೀಯುತ ನಿರಂಜನ ಮೂರ್ತಿ ಎಂ

ಶಿಕ್ಷಣಾಧಿಕಾರಿಗಳು

ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ

ದಾವಣಗೆರೆ

ಶ್ರೀ ರವಿ ಎಲ್  
ಉಪಯೋಜನಾ ಸಮನ್ವಯಾಧಿಕಾರಿಗಳು  
(ಆರ್ ಎಂ ಎಸ್ ಎ)  
ಸಮಗ್ರ ಶಿಕ್ಷಣ ಕನಾಟಕ  
ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ  
ದಾವಣಗೆರೆ

ಶ್ರೀ ಮಂಜುನಾಥ ಸ್ವಾಮಿ ಎಂ  
ಉಪಯೋಜನಾ ಸಮನ್ವಯಾಧಿಕಾರಿಗಳು,  
(ಎಸ್ ಎಸ್ ಎ)  
ಸಮಗ್ರ ಶಿಕ್ಷಣ ಕನಾಟಕ  
ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ  
ದಾವಣಗೆರೆ

### ಸಮನ್ವಯ

ಶ್ರೀ ಸುರೇಶಪ್ಪ ಎಂ  
ಗಣೀತ ವಿಷಯ ಪರಿವೀಕ್ಷಕರು  
ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ  
ದಾವಣಗೆರೆ

### ಸಹಕಾರ

ಚಿಲ್ಲಾ ಪ್ರೈಡಶಾಲಾ ಮುಖ್ಯೋಪಾಧ್ಯಾಯರ ಸಂಘ, ದಾವಣಗೆರೆ.  
ಚಿಲ್ಲಾ ಪ್ರೈಡಶಾಲಾ ಸಹಶಿಕ್ಷಕರ ಸಂಘ ದಾವಣಗೆರೆ.



ಶ್ರೀಯುತ ಸಿ ಆರ್ ಪರಮೇಶ್ವರಪ್ಪ  
ಉಪನಿರ್ದೇಶಕರು (ಅಡಳಿತ)  
ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ  
ದಾವಣಗರೆ

## ಆಶಯ

“2019–20 ನೇ ಸಾಲಿನಲ್ಲಿ ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಗುಣಾತ್ಮಕ ಫಲಿತಾಂಶವನ್ನು ಪಡೆಯುವ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಶೇಕಡ 80 ಕ್ಕಿಂತ ಹೆಚ್ಚು ಮಕ್ಕಳು ಶೇಕಡ 80 ಕ್ಕಿಂತ ಹೆಚ್ಚು ಅಂತ ಗಳಿಸುವಂತೆ ಕ್ರಮವಹಿಸುವುದು” ಎಂಬ ವಿಷಯ-05 (Vision-05) ಗುರಿ ಹೊಂದಲಾಗಿದ್ದು, ಈ ಗುರಿ ಸಾಧನೆಗಾಗಿ ನಿರ್ದಿಷ್ಟ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಶಾಲಾ ಹಂತದಿಂದ ಜಿಲ್ಲಾ ಹಂತದವರೆಗೆ ಅನುಷ್ಠಾನಗೊಳಿಸಲಾಗುತ್ತಿದೆ. ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ ಫಲಿತಾಂಶವನ್ನು ಉತ್ತಮಪಡಿಸುವುದು ಹಾಗೂ ಗುಣಾತ್ಮಕವಾಗಿ ವಿದ್ಯಾರ್ಥಿಗಳ ಅಂಕಗಳಿಕೆ ವೃದ್ಧಿಯಾಗಲು ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಕಲಿಕಾರ್ಮಾರಕ ಸಂಪನ್ಮೂಲಗಳ ಅಗತ್ಯತೆಯನ್ನು ಮನಗಂಡು ವಿಷಯವಾರು ಕಲಿಕಾ ಮಾರ್ಗದರ್ಶಿಗಳನ್ನು ಪ್ರಕಟಿಸುತ್ತಿರುವುದು ಸಂತೋಷದ ವಿಷಯವಾಗಿದೆ.

ಹಾಗೆಯೇ, ವಿದ್ಯಾರ್ಥಿಗಳು ಮತ್ತು ಶಿಕ್ಷಕರು ಈ ಮಾರ್ಗದರ್ಶಿಗಳನ್ನು ಕೇವಲ ಅಭ್ಯಾಸ ಮುಸ್ತಕಗಳಾಗಿ ಮಾತ್ರ ಪರಿಗಣಿಸುವುದು. ಪರೀಕ್ಷೆ ದೃಷ್ಟಿಯಿಂದ ಪರೀಕ್ಷೆ ಮುಸ್ತಕಗಳನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ಅಧ್ಯಯನ ಮಾಡಲು ತಿಳಿಸುತ್ತಾ, ಜಿಲ್ಲೆಯ ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ ವಿದ್ಯಾರ್ಥಿಗಳು ಇದರ ಪ್ರಯೋಜನ ಪಡೆಯುವರೆಂದು ಆಶಿಸುತ್ತೇನೆ.

ಸ್ಥಳ : ದಾವಣಗರೆ  
ದಿನಾಂಕ : 01/12/2019

ಉಪನಿರ್ದೇಶಕರು (ಅಡಳಿತ)  
ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ  
ದಾವಣಗರೆ

**ಪರಿಕಲ್ಪನೆ ಮತ್ತು ಮಾರ್ಗದರ್ಶನ :** ಶ್ರೀಯುತ ಸಿ ಆರ್ ಪರಮೇಶ್ವರಪ್ಪ  
ಲುಪನಿದೇಶಕರು (ಆಡಳಿತ)  
ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ  
ದಾವಣಗೆರೆ

**ಸಂಪನ್ಮೂಲ ರಚನಾ ಮಾರ್ಗದರ್ಶನ :** ಪಂಚಾಕ್ಷರಪ್ಪ ಜಿ  
ಜಲ್ಲಾ ಗಳಿತ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು  
ಮಾರುತ್ತಿ ಪ್ರೋಥಾಲೆ, ವಿದ್ಯಾನಗರ  
ದಾವಣಗೆರೆ

: ಪ್ರಶ್ನೇಕೋಮಿ ಸಂಪನ್ಮೂಲ ರಚನಾ ತಂಡ :

1. ಸುಜಾತ. ಹೆಚ್. ಎನ್. ರಾ. ಸೀ. ಬಾ. ಸ. ಪ್ರೋಥಾಲೆ ದಾವಣಗೆರೆ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ	2. ಭುವನೇಶ್ವರಿ. ಡಿ. ಕೆ. ಸರ್ಕಾರಿ ಪದವಿಮೂವ್ ಕಾಲೇಜು [ಪ್ರೋಥಾಲಾ ವಿಭಾಗ] ಚನ್ನಗಿರಿ ಚನ್ನಗಿರಿ ತಾಲ್ಲೂಕು	3. ವಿಜಯಕುಮಾರಿ. ಆರ್. ಶ್ರೀ ಆಂಜನೇಯ ಸರ್ಕಾರಿ ಪ್ರೋಥಾಲೆ ತುಚ್ಕಫ್ಲಾಟ್ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ	
4. ದಿಲ್ ಶಾದ್ ಬೇಗಂ ಸರ್ಕಾರಿ ಪದವಿ ಮೂವ್ ಕಾಲೇಜು [ಪ್ರೋಥಾಲಾ ವಿಭಾಗ] ದಾವಣಗೆರೆ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ	5. ಅನಿತಾ. ಬಿ. ಆರ್. ಸರ್ಕಾರಿ ಪ್ರೋಥಾಲೆ ಹಿರೇತೋಗಲೇರಿ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ	6. ಅರುಣಕುಮಾರಿ ಸರ್ಕಾರಿ ಪ್ರೋಥಾಲೆ ರಾಮಗೌಂಡನಹಳ್ಳಿ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ	7. ಅನಿತಾ. ಕೆ. ಆರ್. ಅಣಬೇರು ಕೆಂಚಪ್ಪ ಪ್ರೋಥಾಲೆ, ಬಾಡ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ

: Digitalization ತಂಡ :

1. ಸುಜಾತ. ಹೆಚ್. ಎನ್. ರಾ. ಸೀ. ಬಾ. ಸ. ಪ್ರೋಥಾಲೆ ದಾವಣಗೆರೆ ದಾವಣಗೆರೆ ದಕ್ಷಿಣ	2. ಭುವನೇಶ್ವರಿ. ಡಿ. ಕೆ. ಸರ್ಕಾರಿ ಪದವಿಮೂವ್ ಕಾಲೇಜು [ಪ್ರೋಥಾಲಾ ವಿಭಾಗ] ಚನ್ನಗಿರಿ ತಾಲ್ಲೂಕು	3. ಸುಹೇಬ್ ಬೇಗ್ ಸರ್ಕಾರಿ ಉದ್ಯೋ ಪ್ರೋಥಾಲೆ ಕರೆಬಿಳಂಜಿ ಚನ್ನಗಿರಿ ತಾಲ್ಲೂಕು
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4. ಮುಸರತ್ ಫಾತೀಮಾ ಸರ್ಕಾರಿ ಪದವಿಮೂವ್ ಕಾಲೇಜು [ಪ್ರೋಥಾಲಾ ವಿಭಾಗ] ಚನ್ನಗಿರಿ ತಾಲ್ಲೂಕು	5. ರೀನಾ. ಎನ್. ಎಮ್. ಸರ್ಕಾರಿ ಪ್ರೋಥಾಲೆ ಗುತ್ತೂರು ಹರಿಹರ ತಾಲ್ಲೂಕು	6. ಲಕ್ಷ್ಮೀ. ಬಿ. ಸರ್ಕಾರಿ ಪ್ರೋಥಾಲೆ ಕುಂದೂರು – ಕೂಲಂಬಿ ಹೊನ್ನಾಳಿ ತಾಲ್ಲೂಕು	7. ರಾಘವೇಂದ್ರ. ಟಿ. ಎಂ. ಸರ್ಕಾರಿ ಪ್ರೋಥಾಲೆ ಯರೆಚಿಕ್ಕನಹಳ್ಳಿ ಹೊನ್ನಾಳಿ ತಾಲ್ಲೂಕು
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## **: PRACTICE CONTENT KEY ANSWERS :**

### **10<sup>th</sup> 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  $x = -1$

$$\begin{aligned} \text{Ans : } p(-1) &= (-1)^2 - 3(-1) - 4 \\ &= 1 + 3 - 4 \\ &= 0 \end{aligned}$$

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

$$\begin{aligned} \text{Ans : } p(-1) &= 2(-1)^3 - 3(-1)^2 + 6 \\ &= -2 - 3 + 6 \\ &= 1 \end{aligned}$$

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

$$\begin{aligned} \text{Ans : } p(4) &= (4)^2 - 3(4) - 4 \\ &= 16 - 12 - 4 \\ &= 0 \end{aligned}$$

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

$$\begin{aligned}\text{Ans : } p(2) &= (2)^2 + 7(2) + 10 \\ &= 4 + 14 + 10 \\ &= 28\end{aligned}$$

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

$$\begin{aligned}\text{Ans : } p(2) &= (2)^3 - 2(2)^2 - 3(2) + 5 \\ &= 8 - 8 - 6 + 5 \\ &= -1\end{aligned}$$

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

$$\begin{aligned}\text{Ans : } p(1) &= 2(1)^3 - 5(1)^2 + 4(1) + 8 \\ &= 2 - 5 + 4 + 8 \\ &= 9\end{aligned}$$

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

$$\begin{aligned}\text{Ans : } p(2) &= (2)^3 - 3(2)^2 + 6 \\ &= 8 - 12 + 6 \\ &= 2\end{aligned}$$

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

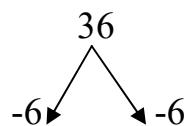
$$\begin{aligned}\text{Ans : } p(1) &= (1)^3 - 2(1)^2 + 5 \\ &= 1 - 2 + 5 \\ &= 4\end{aligned}$$

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)  $\frac{3}{2}$  &  $\frac{3}{2}$

$$\begin{array}{r} 4x^2 - 12x + 9 \\ 4x^2 - 6x - 6x + 9 \\ \hline 2x(2x - 3) - 3(2x - 3) \\ (2x - 3)(2x - 3) \\ x = \frac{3}{2} \text{ & } \frac{3}{2} \end{array}$$



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)  $x^2 - 36$

$$\begin{aligned}\text{Given, } m + n &= 0 && \text{if } m = 6 \\ 6 + n &= 0 \\ n &= -6\end{aligned}$$

Equation of quadratic polynomial is  $x^2 - (m + n)x + mn$

$$\begin{aligned}&= x^2 - [6 + (-6)]x + (6)(-6) \\ &= x^2 - [0]x + (6)(-6) \\ &= x^2 - 36\end{aligned}$$

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

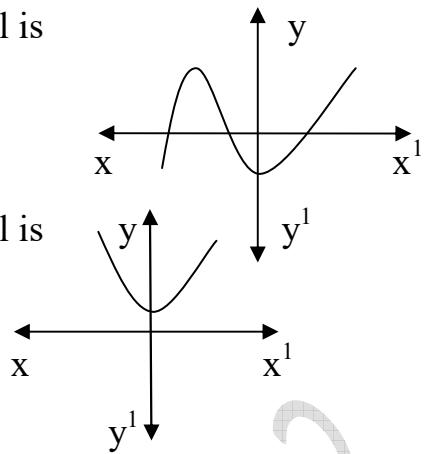
- A) 0      B) 1      C) 2      D) 3

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

$$\begin{aligned} P(E) &= 1 - P(\bar{E}) && \text{given, } P(\bar{E}) = 0.62 \\ &= 1 - 0.62 \\ &= 0.38 \end{aligned}$$

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 :  $S = \{H, T\}$   $\therefore n(S) = 2$  & Certain event A is  $\{H\}$   $\therefore n(A) = 1$

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

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

$$\begin{aligned} \text{Ans : } P(E) &= 1 - P(\bar{E}) && \text{Given, } P(\bar{E}) = 0.05 \\ &= 1 - 0.05 \\ &= 0.95 \end{aligned}$$

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  $\bar{E}$  stands for “not E”. E &  $\bar{E}$  are called The Complementary events.

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

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

$\therefore$  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)  $p^2 - 4qr$

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

D)  $q^2 - 4qr$

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

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

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

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

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

$$x+4=0 \text{ & } x+3=0$$

$$\therefore x = -4 \text{ & } x = -3$$

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

$$kx^2 - 2kx + 6 = 0 \therefore$$

$$\therefore a = k, b = -2k \text{ & } c = 6$$

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

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

$$4k^2 - 24k = 0$$

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

$$4k = 0 \text{ & } k-6 = 0$$

$$\text{Then, } k \neq 0 \text{ & } k = 6$$

33) "Length of a rectangular garden is twice of its breadth and its area is  $800 \text{ cm}^2$ ."

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  $A = \text{length} \times \text{breadth}$  ]

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

$$\begin{aligned}\therefore a_4 &= 3(4) - 2 \\ &= 12 - 2 \\ a_4 &= 10\end{aligned}$$

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

$$\begin{aligned}\therefore a_n &= 2(3)^2 - 2 \\ &= 2(9) - 2 \\ &= 18 - 2 \\ a_3 &= 16\end{aligned}$$

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

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

Ans : B) -2

$$\begin{aligned}\therefore d &= a_2 - a_1 \\ &= 1 - 3 \\ &= -2\end{aligned}$$

40) The 6<sup>th</sup> term of the arithmetic progression 2, 5, 8.... is

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

Ans : C) 17

$$\begin{aligned}\because a_n &= a + (n - 1)d & a = 2, n = 6, d = 5 - 2 = 3 \\ a_6 &= 2 + (6 - 1)3 \\ &= 2 + (5)3 \\ &= 2 + 15 \\ a_6 &= 17\end{aligned}$$

41) The 8<sup>th</sup> term of arithmetic progression 2, 7, 12.... is

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

Ans : C) 37

$$\begin{aligned}\because a_n &= a + (n - 1)d \quad a = 2, n = 8, d = 7 - 2 = 5 \\ a_8 &= 2 + (8 - 1)5 \\ &= 2 + (7)5 \\ &= 2 + 35 \\ a_8 &= 37\end{aligned}$$

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

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

Ans : D) -1

$$\begin{aligned}\because a_n &= 5 - 2(3) \\ a_3 &= 5 - 6 \\ &= -1\end{aligned}$$

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

- A) 3      B) 5      C) 7      D) 9

Ans : D) 9

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

44) The n<sup>th</sup> term of the arithmetic progression 4, 2, 0, -2.... is

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

Ans : D)  $2 - 2n$

$$\begin{aligned}\because a_n &= a + (n - 1)d \quad a = 4, n = n, d = 2 - 4 = -2 \\ &= 4 + (n - 1) - 2 \\ &= 4 - 2n + 2 \\ a_n &= 2 - 2n\end{aligned}$$

### 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

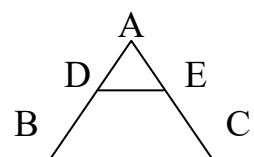
Ans : C) 16 : 81

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

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



$$\begin{aligned}\therefore \frac{AD}{DB} &= \frac{AE}{EC} \\ \frac{1}{2} &= \frac{3}{EC} \\ EC &= 6\text{cm}\end{aligned}$$

47) The Pythagorean 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

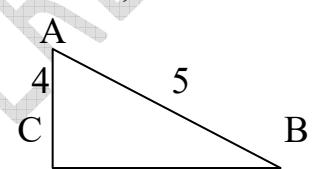
$$\begin{aligned}\therefore 13^2 &= 12^2 + 5^2 \\ 169 &= 144 + 25 \\ 169 &= 169\end{aligned}$$

48) In right angled  $\Delta ABC$ ,  $\angle C = 90^\circ$ . If the length of  $AB = 5\text{cm}$ ,  $AC = 4\text{cm}$ , then length of  $BC$  is

- A) 2      B) 3      C) 6      D) 8

Ans : B) 3

$$\begin{aligned}\text{By Pythagoras theorem } AB^2 &= AC^2 + BC^2 \\ BC^2 &= AB^2 - AC^2 \\ &= 5^2 - 4^2\end{aligned}$$



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

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

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

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

50) In a right angled  $\Delta ABC$ ,  $AB = 10\text{cm}$ ,  $BC = 8\text{cm}$ ,  $AC = 6\text{cm}$ , then the vertex of the right angled triangle is

- A)  $\angle A$       B)  $\angle B$       C)  $\angle C$       D)  $\angle D$

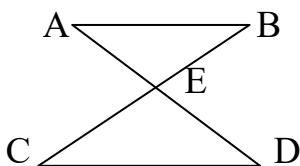
Ans : C)  $\angle C$

$\therefore$  According to given data AB is diagonal. So,  $\angle C$  vertex of the right angle.

51) In the adjoining figure, the corresponding angles are

- A)  $\angle A$  &  $\angle C$       B)  $\angle A$  &  $\angle B$   
C)  $\angle D$  &  $\angle B$       D)  $\angle A$  &  $\angle D$

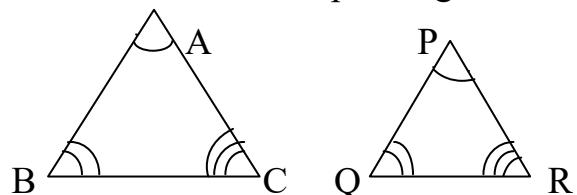
Ans : D)  $\angle A$  &  $\angle D$



52) In the adjoining figure, if  $\Delta ABC \cong \Delta PQR$ , 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 :  $A = 2\pi r ( h + r )$

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 :  $A = \pi r ( l + r )$

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).

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

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

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

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

$$d = \sqrt{137}$$

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

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

➤ 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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 :  $(x + 2y = 9) \dots\dots\dots(1)$

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

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

$\Rightarrow 2x - y = 8$

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

$5y = 10$

[ By subtracting (2) from (1) ]

$\therefore y = 2$

Let,  $x + 2y = 9$

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

$x + 4 = 9$

$x = 9 - 4$

$\therefore x = 5$

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

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

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

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

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

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

$4x = 8$

$\therefore x = 2$

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

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

$4 + y = 6$

$y = 6 - 4$

$\therefore y = 2$

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

$\underline{2x + 2y = 3} \dots\dots\dots(1)$

$2x - 3y = 8 \dots\dots\dots(2)$

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

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

$\therefore y = -1$

Let,  $2x + 2y = 3$

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

$2x - 2 = 3$

$2x = 3 + 2$

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

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

$$2x - 2y = 8 \quad \dots \dots \dots (1)$$

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

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

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

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

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

$$\text{Let, } 2x - 2y = 8$$

$$2x - 2(4) = 8 \quad [ \text{By substituting the value } y \text{ in (1)} ]$$

$$2x - 8 = 8$$

$$2x = 8 + 8$$

$$2x = 16$$

$$\therefore x = 8$$

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

$$x + 3y = 6 \quad \dots \dots \dots (1)$$

$$\underline{2x - 3y = 12} \quad \dots \dots \dots (2)$$

$$3x = 18$$

[ By adding (1) & (2) ]

$$\therefore x = 6$$

$$\text{Let, } x + 3y = 6$$

$$6 + 3y = 6 \quad [ \text{By substituting the value } x \text{ in (1)} ]$$

$$3y = 6 - 6$$

$$3y = 0$$

$$\therefore y = 0$$

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

$$x + 2y = 3 \quad \dots \dots \dots (1)$$

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

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

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

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

$$7y = 0$$

[ By subtracting (2) from (1) ]

$$\therefore y = 0$$

$$\text{Let, } x + 2y = 3$$

$$x + 2(0) = 3 \quad [ \text{By substituting the value } y \text{ in (1)} ]$$

$$x = 3 - 0$$

$$\therefore x = 3$$

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

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

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

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

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

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

$$-4y = -48$$

$$\therefore y = 12$$

$$\begin{aligned}
 \text{Let, } x - 3y &= 6 \\
 x - 3(12) &= 6 && [\text{By substituting the value } y \text{ in (1)}] \\
 x - 36 &= 6 \\
 x &= 6 + 36 \\
 \therefore x &= 42
 \end{aligned}$$

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

$$\begin{aligned}
 2x + 3y &= 5 \quad \text{---(1)} \\
 x + 2y &= 3 \quad \text{---(2)} \\
 \Rightarrow 2x + 3y &= 5 \\
 \Rightarrow 2x + 4y &= 6 && [\text{Equation (2) multiply by 2}] \\
 (-) \quad (-) \quad (-) \\
 -y &= -1 && [\text{By subtracting (2) from (1)}] \\
 \therefore y &= 1
 \end{aligned}$$

Let,  $x + 2y = 3$

$$\begin{aligned}
 x + 2(1) &= 3 && [\text{By substituting the value } y \text{ in (1)}] \\
 x + 2 &= 3 \\
 x &= 3 - 2 \\
 \therefore x &= 1
 \end{aligned}$$

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

$$\begin{aligned}
 x - 3y + 3 &= 0 \quad \text{---(1)} \\
 2x + y &= 8 \quad \text{---(2)} \\
 x - 3y &= -3 \\
 6x + 3y &= 24 \\
 7y &= 21 && [\text{By adding (1) \& (2)}] \\
 \therefore y &= 3
 \end{aligned}$$

Let,  $x - 3y = -3$

$$\begin{aligned}
 x &= 3y - 3 && [\text{By substituting the value } y \text{ in (1)}] \\
 x &= 3(3) - 3 \\
 x &= 9 - 3 \\
 \therefore x &= 6
 \end{aligned}$$

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

$$\begin{aligned}
 y &= 2 - x \\
 y &= 2 + x && [\text{By adding (1) \& (2)}] \\
 2y &= 4 \\
 \therefore y &= 2
 \end{aligned}$$

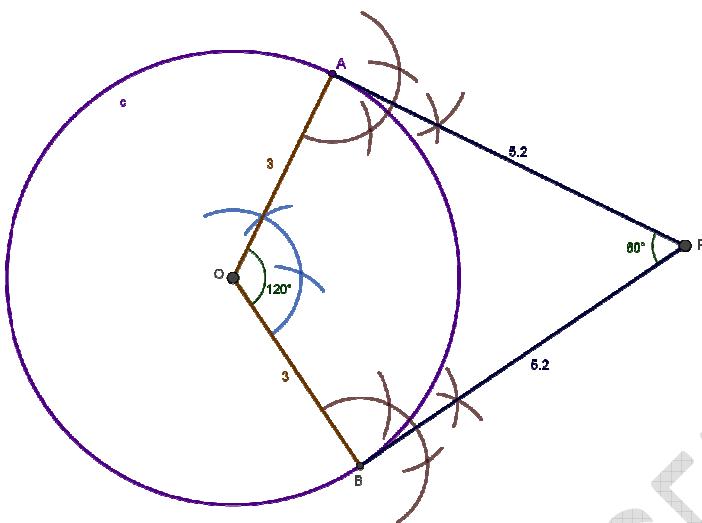
Let,  $y = 2 + x$  [ By substituting the value  $y$  in (2) ]

$$\begin{aligned}
 2 &= 2 + x \\
 x &= 2 - 2 \\
 \therefore x &= 0
 \end{aligned}$$

**: 2 MARK QUESTIONS :**

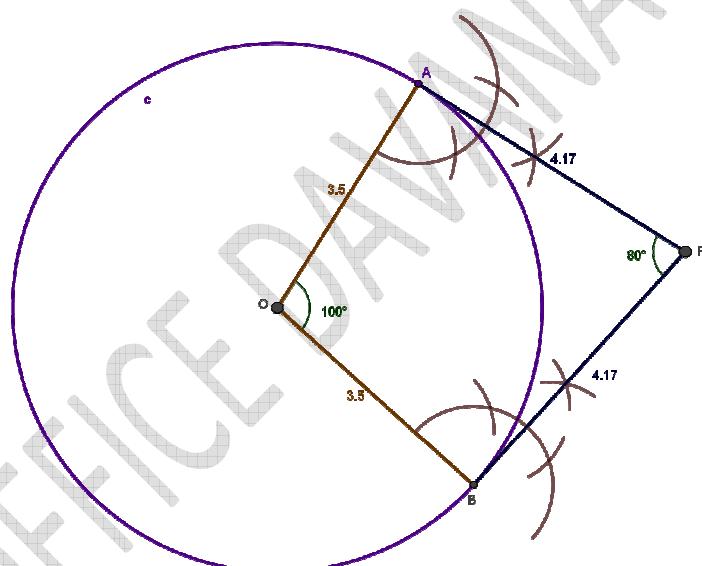
**CONSTRUCTIONS**

- 21) Radius of a circle is 3cm, angle between radii is  $120^\circ$ . Construct the pair of tangent at the end points of the radii.



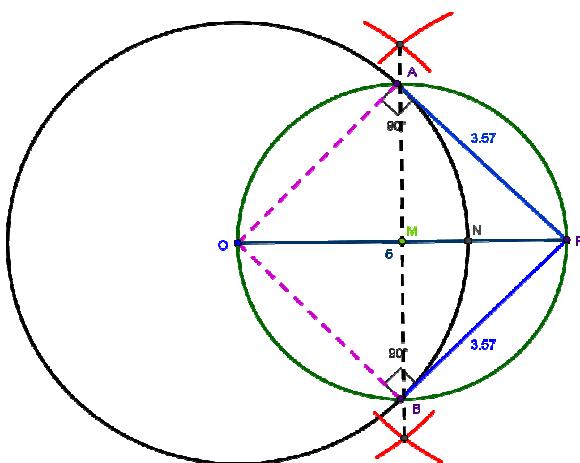
PA and PB are the tangents.

- 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  $100^\circ$ .



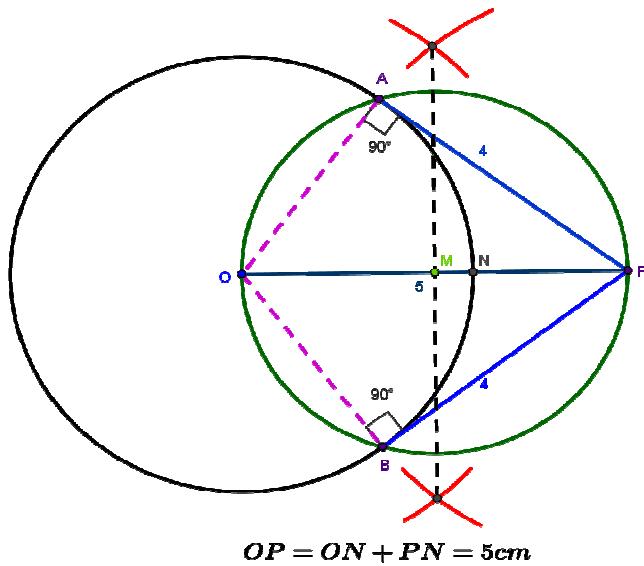
PA and PB are the tangents.

- 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.



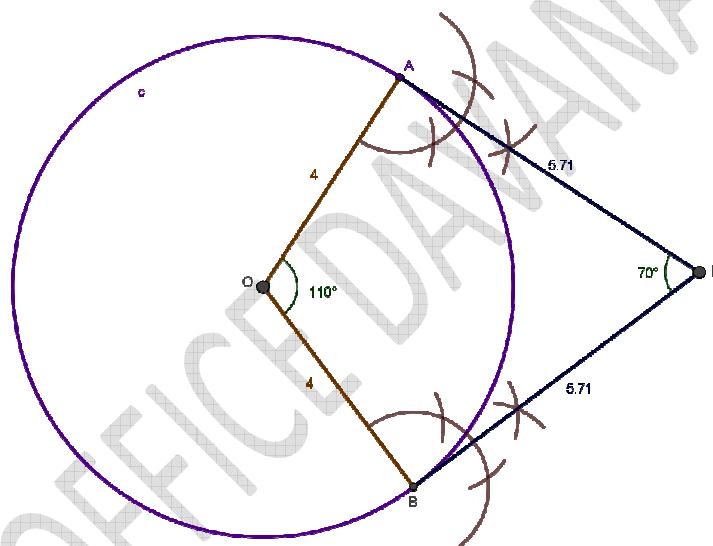
PA and PB are the tangents.

- 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.



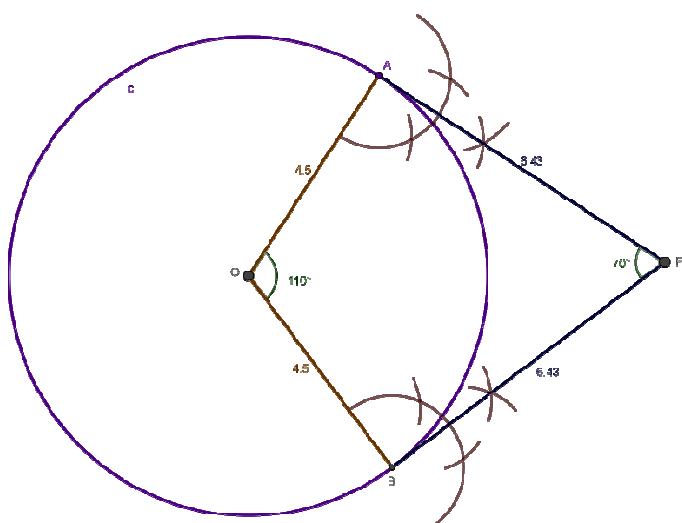
PA and PB are the tangents.

- 25) Construct tangent at the end points of radii circle of radius 4cm in which angle between radii is  $110^\circ$ .



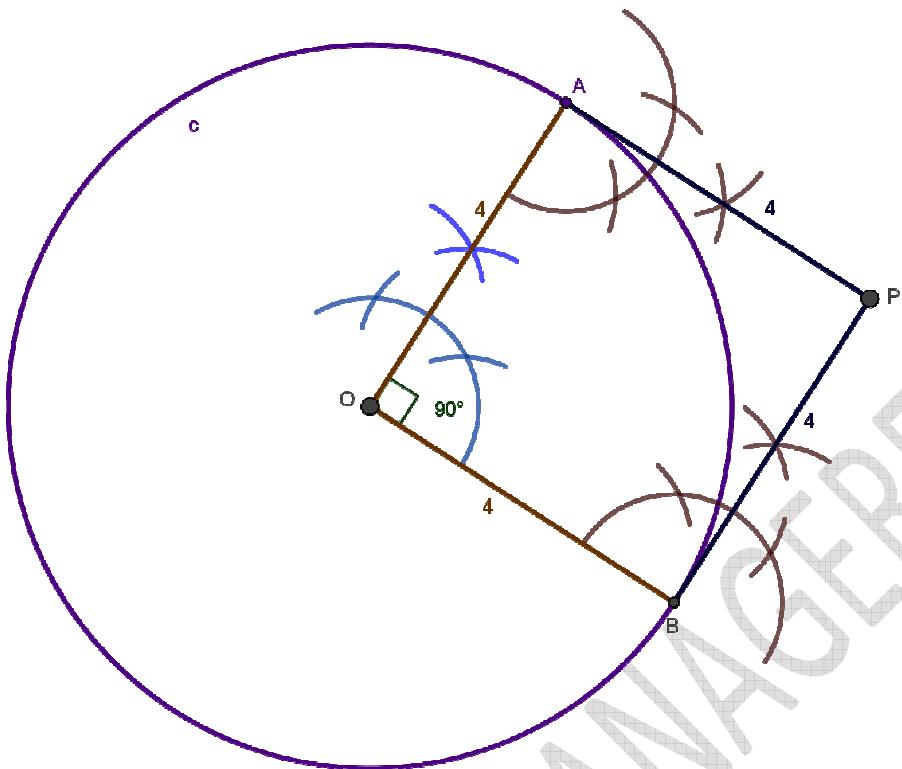
PA and PB are the tangents.

- 26) Construct tangent at the end points of radius of a circle whose radius is 4.5 cm angle between tangents is  $70^\circ$ .



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  $90^\circ$ .



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

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  $[6, -94]$

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  $[4, -1]$

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

<b>38</b> $p(x) = x^3 - 2x^2 + 4x - 4$ $g(x) = x - 2$	<b>39</b> $p(x) = x^3 - 3x^2 + 4x - 4$ $g(x) = x - 1$
$\begin{array}{r} (x^2 + 4) \longrightarrow \text{quotient} \\ x - 2 \quad   \quad \begin{array}{r} x^3 - 2x^2 + 4x - 4 \\ x^3 - 2x^2 \\ (-) \quad (+) \\ \hline 4x - 4 \\ 4x - 8 \\ (-) \quad (+) \\ \hline + 4 \end{array} \longrightarrow \text{remainder} \end{array}$	$\begin{array}{r} (x^2 - 2x + 2) \longrightarrow \text{quotient} \\ x - 1 \quad   \quad \begin{array}{r} x^3 - 3x^2 + 4x - 4 \\ x^3 - x^2 \\ (-) \quad (+) \\ \hline - 2x^2 + 4x \\ - 2x^2 + 2x \\ (+) \quad (-) \\ \hline 2x - 4 \\ 2x - 2 \\ (-) \quad (+) \\ \hline - 2 \end{array} \longrightarrow \text{remainder} \end{array}$
<b>40</b> $p(x) = x^5 - 4x^3 + x^2 + 3x + 1$ $g(x) = x^3 - 5x + 1$	<b>41</b> $p(x) = x^2 + 5x - 3$ $g(x) = x + 3$
$\begin{array}{r} (x^2 + 1) \longrightarrow \text{quotient} \\ x^3 - 5x + 1 \quad   \quad \begin{array}{r} x^5 - 4x^3 + x^2 + 3x + 1 \\ x^5 - 5x^3 + x^2 \\ (-) \quad (+) \quad (-) \\ \hline x^3 + 3x + 1 \\ x^3 - 5x + 1 \\ (-) \quad (+) \quad (-) \\ \hline 8x \end{array} \longrightarrow \text{remainder} \end{array}$	$\begin{array}{r} (x + 2) \longrightarrow \text{quotient} \\ x + 3 \quad   \quad \begin{array}{r} x^2 + 5x - 3 \\ x^2 + 3x \\ (-) \quad (-) \\ \hline 2x - 3 \\ 2x + 6 \\ (-) \quad (-) \\ \hline - 9 \end{array} \longrightarrow \text{remainder} \end{array}$

42

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

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

$(2x - 1) \longrightarrow \text{quotient}$

$x + 2$	$\begin{array}{r} 2x^2 + 3x + 1 \\ 2x^2 + 4x \\ (-) \quad (-) \\ \hline -x + 1 \\ -x - 2 \\ (+) \quad (+) \\ \hline +3 \end{array}$	$\rightarrow \text{remainder}$
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43

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

$$g(x) = x - 3$$

$(x^2 - 4x - 9) \longrightarrow \text{quotient}$

$x - 3$	$\begin{array}{r} x^3 - 7x^2 + 3x - 6 \\ x^3 - 3x^2 \\ (-) \quad (+) \\ \hline -4x^2 + 3x - 6 \\ -4x^2 + 12x \\ (+) \quad (-) \\ \hline -9x - 6 \\ -9x + 27 \\ (+) \quad (-) \\ \hline -33 \end{array}$	$\rightarrow \text{remainder}$
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44

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

$$g(x) = x - 5$$

$(x^2 - x - 6) \longrightarrow \text{quotient}$

$x - 1$	$\begin{array}{r} x^3 - 2x^2 - 5x - 2 \\ x^3 - x^2 \\ (-) \quad (+) \\ \hline -x^2 - 5x - 2 \\ -x^2 + x \\ (+) \quad (-) \\ \hline -6x - 2 \\ -6x + 6 \\ (+) \quad (-) \\ \hline -8 \end{array}$	$\rightarrow \text{remainder}$
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45

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

$$g(x) = x - 2$$

$(x^2 + 3) \longrightarrow \text{quotient}$

$x - 2$	$\begin{array}{r} x^3 - 2x^2 + 3x - 6 \\ x^3 - 2x^2 \\ (-) \quad (+) \\ \hline +3x - 6 \\ +3x - 6 \\ (-) \quad (+) \\ \hline 0 \end{array}$	$\rightarrow \text{remainder}$
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46

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

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

$(3x - 5) \longrightarrow \text{quotient}$

$x^2 + 2x + 1$	$\begin{array}{r} 3x^3 + x^2 + 2x + 5 \\ 3x^3 + 6x^2 + 3x \\ (-) \quad (-) \quad (-) \\ \hline -5x^2 - x + 5 \\ -5x^2 - 10x - 5 \\ (+) \quad (+) \quad (+) \\ \hline 9x + 10 \end{array}$	$\rightarrow \text{remainder}$
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47

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

$$g(x) = x - 2$$

$(x^2 - x + 7) \longrightarrow \text{quotient}$

$x - 2$	$\begin{array}{r} x^3 - 3x^2 + 5x - 3 \\ x^3 - 2x^2 \\ (-) \quad (+) \\ \hline -x^2 + 5x - 3 \\ -x^2 - 2x \\ (+) \quad (+) \\ \hline 7x - 3 \\ 7x - 14 \\ (-) \quad (+) \\ \hline 11 \end{array}$	$\rightarrow \text{remainder}$
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## UNIT : COORDINATE GEOMETRY

**Find the distance between the following coordinate points :**

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(6 - 2)^2 + (6 - 3)^2} \\ &= \sqrt{(4)^2 + (3)^2} \\ &= \sqrt{16 + 9} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-3 - 2)^2 + (-7 - 5)^2} \\ &= \sqrt{(-5)^2 + (-12)^2} \\ &= \sqrt{25 + 144} \\ &= \sqrt{169} \\ &= 13 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(8 - 8)^2 + (-7 - 3)^2} \\ &= \sqrt{(0)^2 + (-10)^2} \\ &= \sqrt{0 + 100} \\ &= \sqrt{100} \\ &= 10 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(6 - 2)^2 + (8 - 8)^2} \\ &= \sqrt{(4)^2 + (0)^2} \\ &= \sqrt{16 + 0} \\ &= \sqrt{16} \\ &= 4 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(0 - 3)^2 + (0 - 4)^2} \\ &= \sqrt{(-3)^2 + (-4)^2} \\ &= \sqrt{9 + 16} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(18 - 6)^2 + (18 - 9)^2} \\ &= \sqrt{(12)^2 + (9)^2} \\ &= \sqrt{144 + 81} \\ &= \sqrt{225} \\ &= 15 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-13 - 5)^2 + (7 - 3)^2} \\ &= \sqrt{(-18)^2 + (4)^2} \\ &= \sqrt{324 + 16} \\ &= \sqrt{340} \\ &= 2\sqrt{85} \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(12 - 4)^2 + (12 - 6)^2} \\ &= \sqrt{(8)^2 + (6)^2} \\ &= \sqrt{64 + 36} \\ &= \sqrt{100} \\ &= 10 \end{aligned}$$

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

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-2 - (-2))^2 + (9 - (-2))^2} \\ &= \sqrt{(-2 + 2)^2 + (9 + 2)^2} \\ &= \sqrt{(0)^2 + (11)^2} \\ &= \sqrt{121} \\ &= 11 \end{aligned}$$

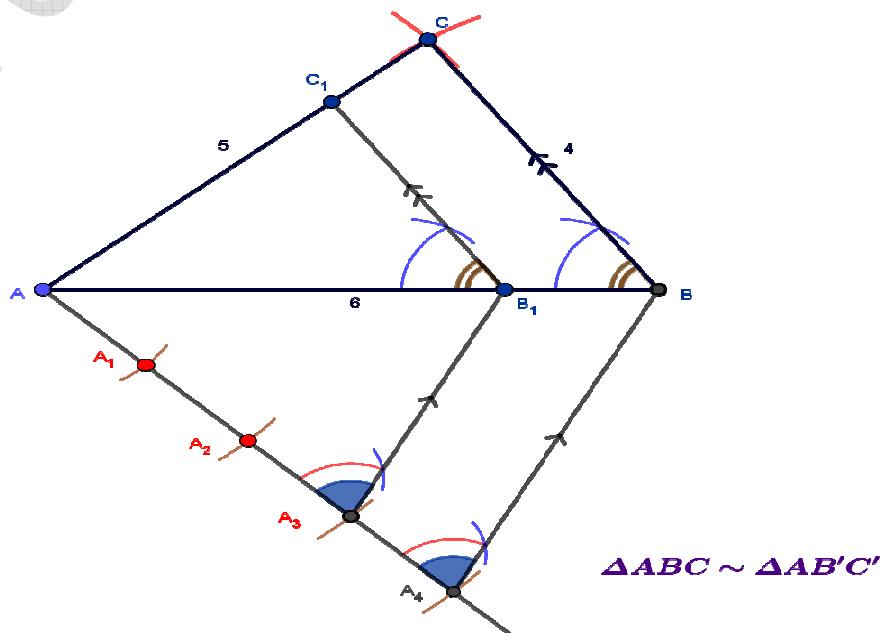
57) ( -3, 5 ) & ( 0, 1 )

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(0 - (-3))^2 + (1 - 5)^2} \\ &= \sqrt{(3)^2 + (-4)^2} \\ &= \sqrt{9 + 16} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

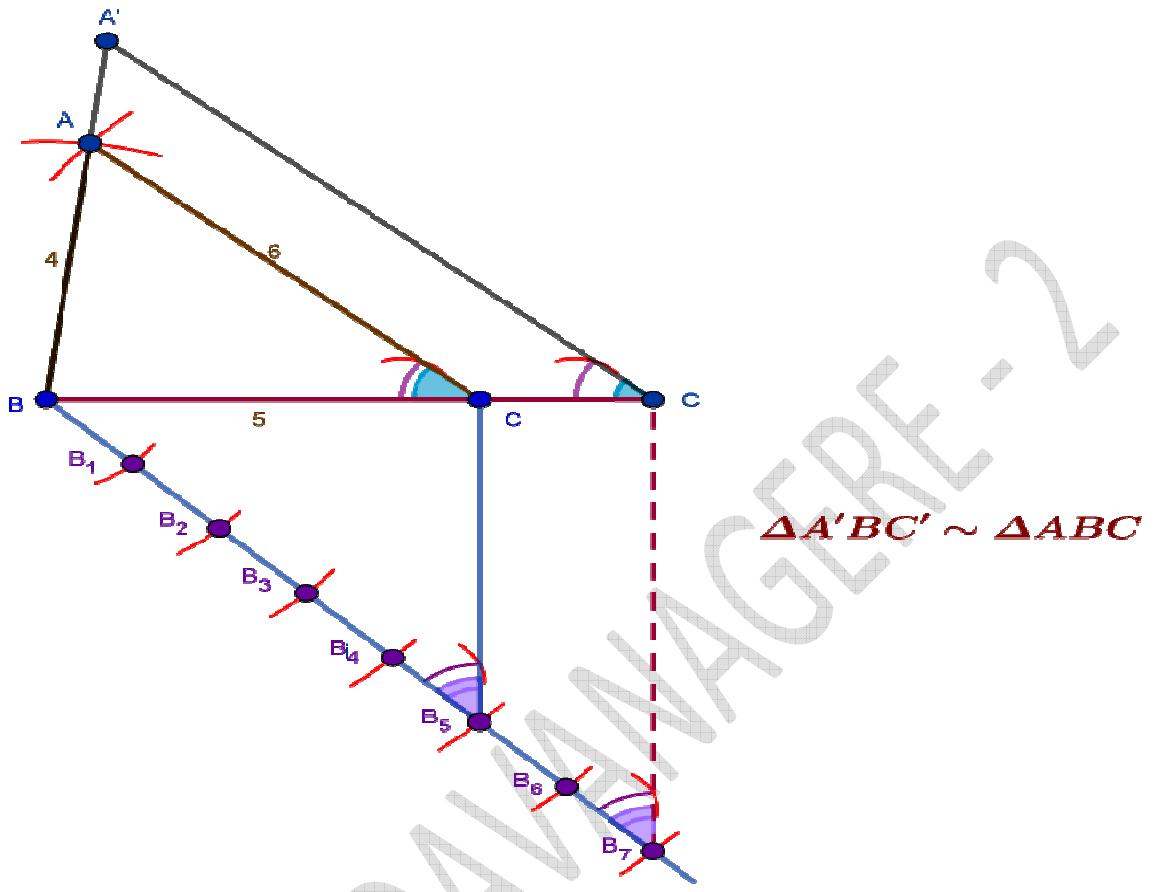
### 3 MARK QUESTIONS

#### UNIT : CONSTRUCTIONS

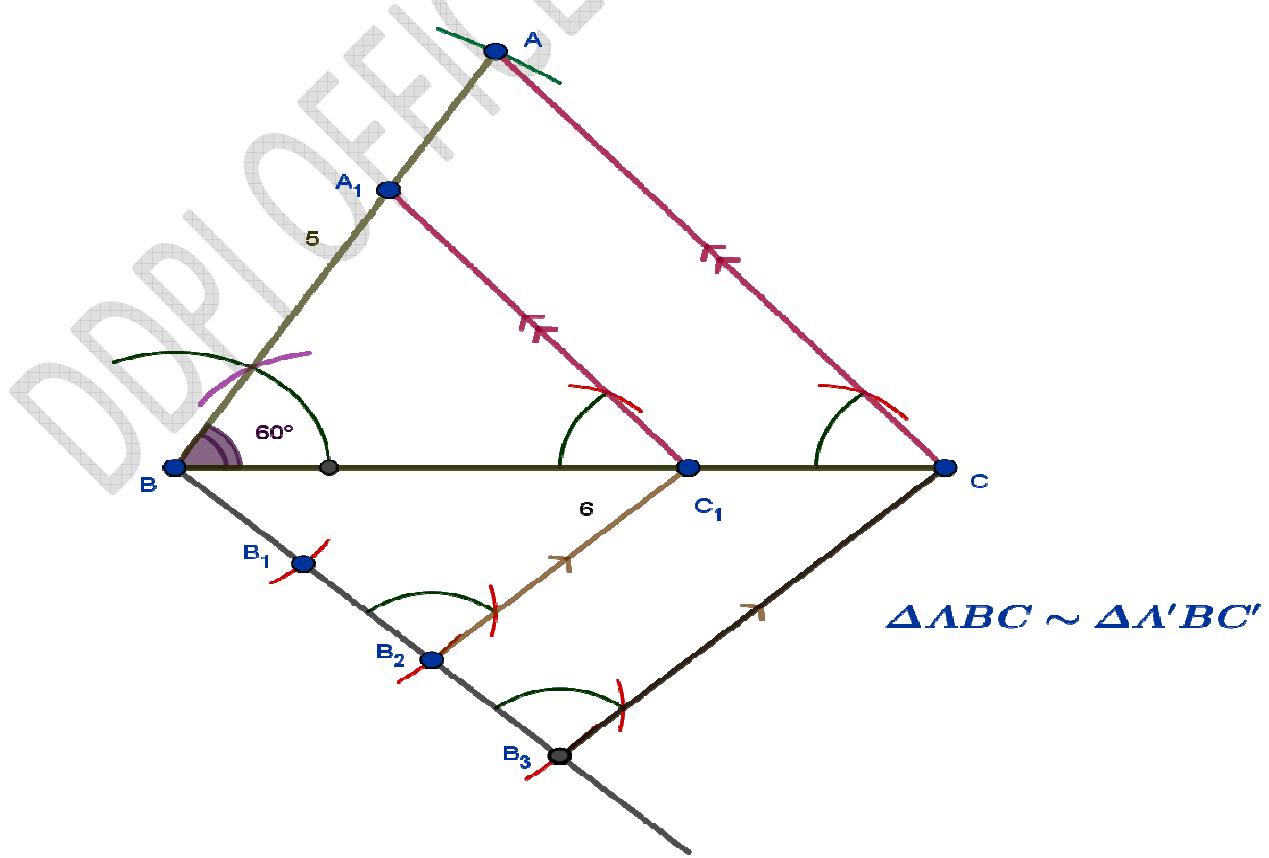
- 1) Draw a triangle ABC with sides of 4cm, 5cm & 6cm. Then construct another triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the triangle ABC.



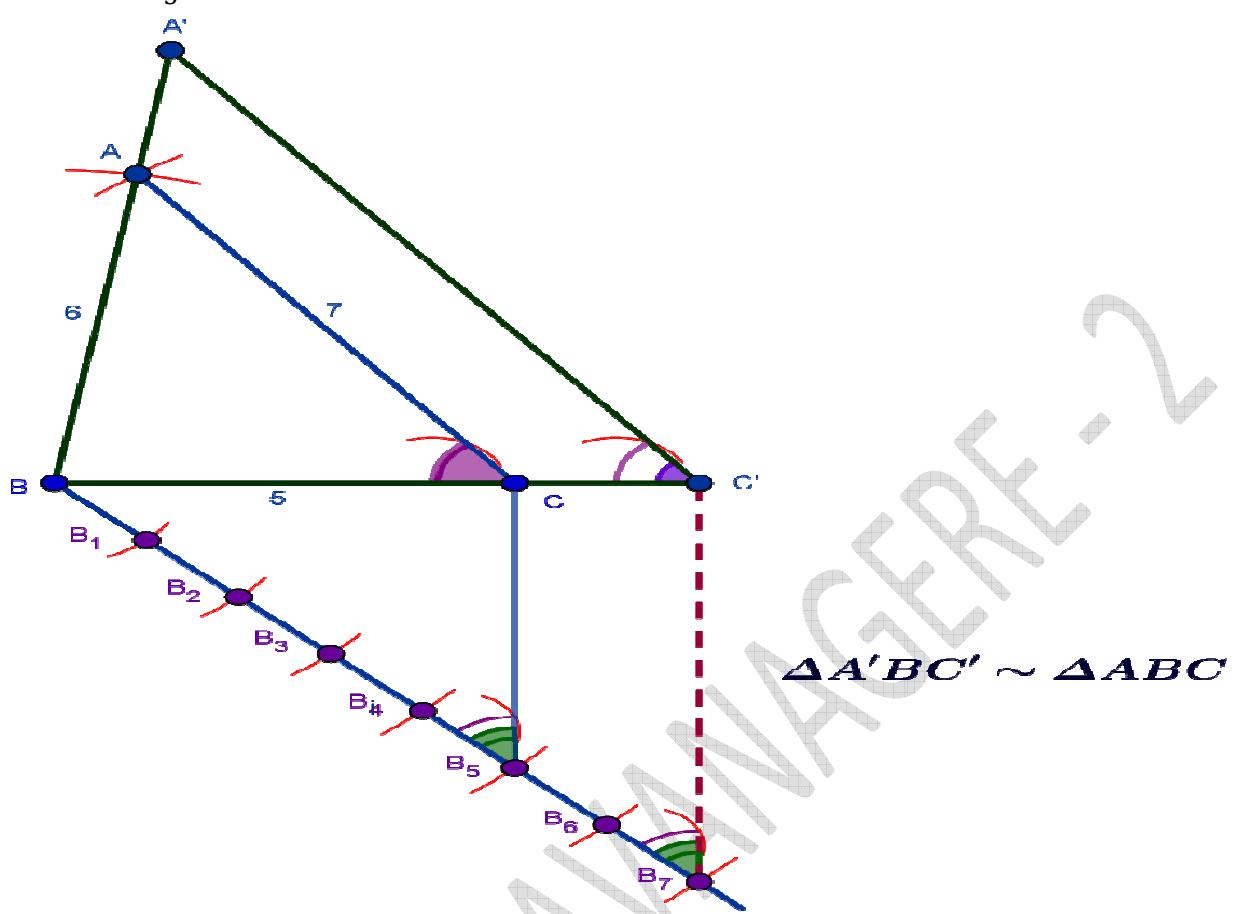
2) Draw a triangle ABC with sides of 4 cm, 5cm & 6cm. Then construct another triangle whose sides are  $\frac{7}{5}$  of the corresponding sides of the triangle ABC.



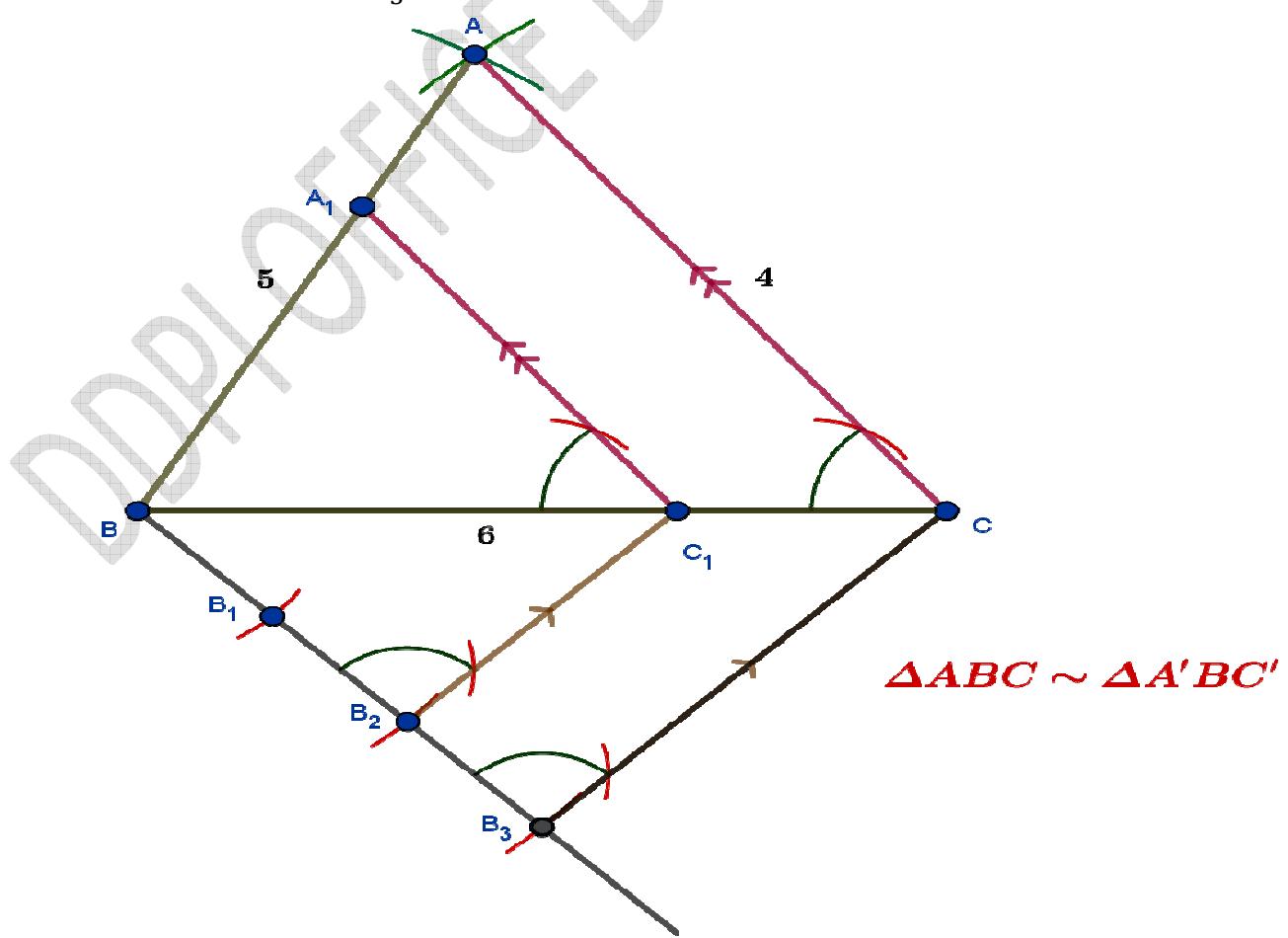
3) Draw a triangle ABC with sides BC = 6cm, AB = 5cm &  $\angle B = 60^\circ$ . Then construct another triangle whose sides are  $\frac{2}{3}$  of the corresponding sides of the triangle ABC.



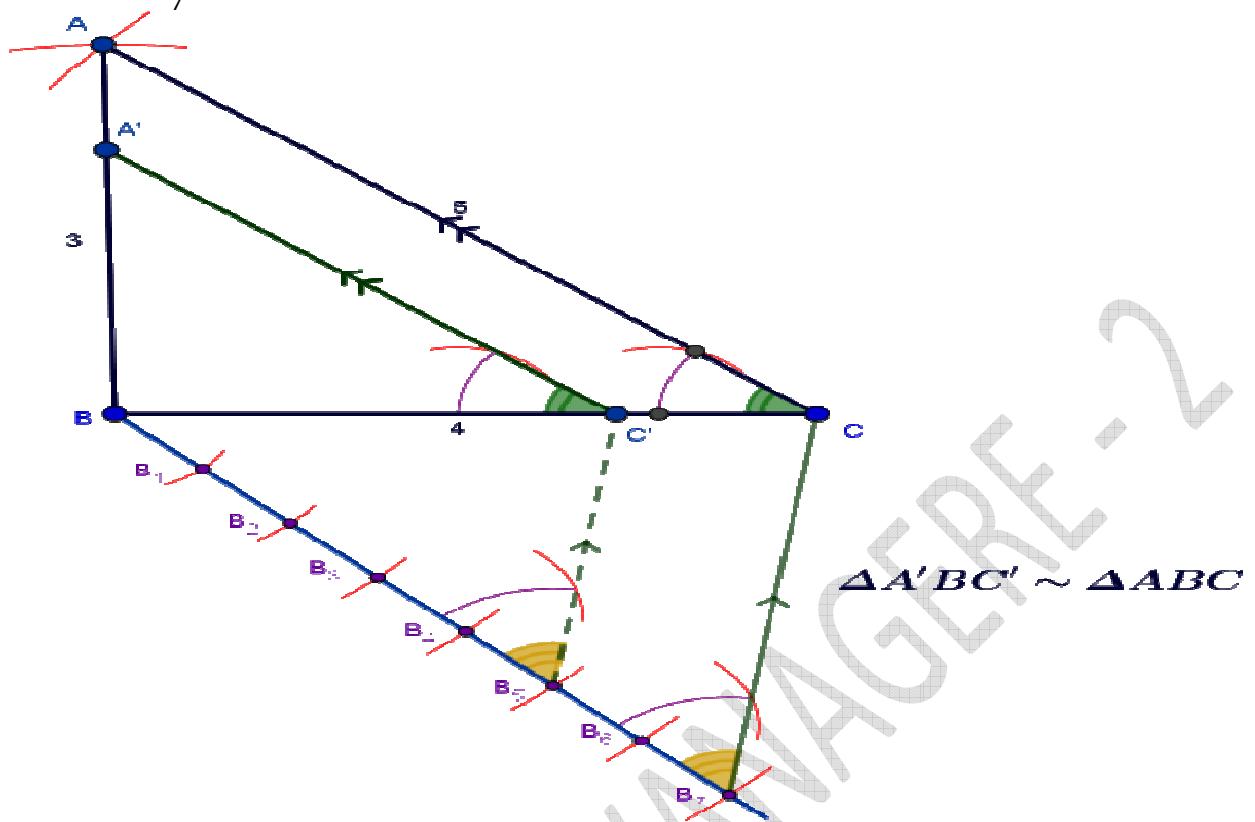
4) Draw a triangle ABC with sides of 6 cm, 5cm & 7cm. Then construct another triangle whose sides are  $\frac{7}{5}$  of the corresponding sides of the triangle ABC.



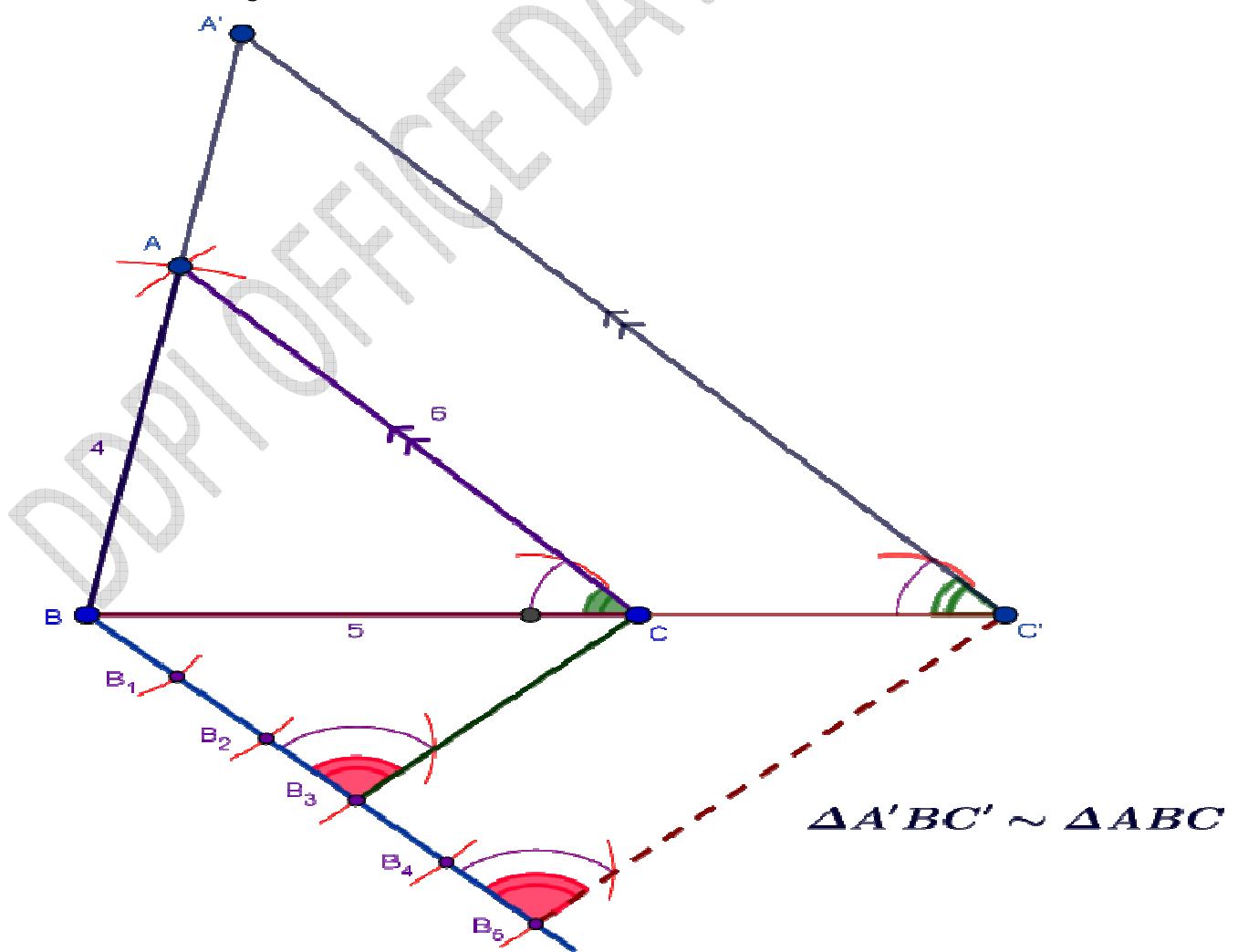
5) Draw a triangle ABC with sides BC=6cm, AB=5cm & AC= 4cm. Then construct another triangle whose sides are  $\frac{2}{3}$  of the corresponding sides of the triangle ABC.



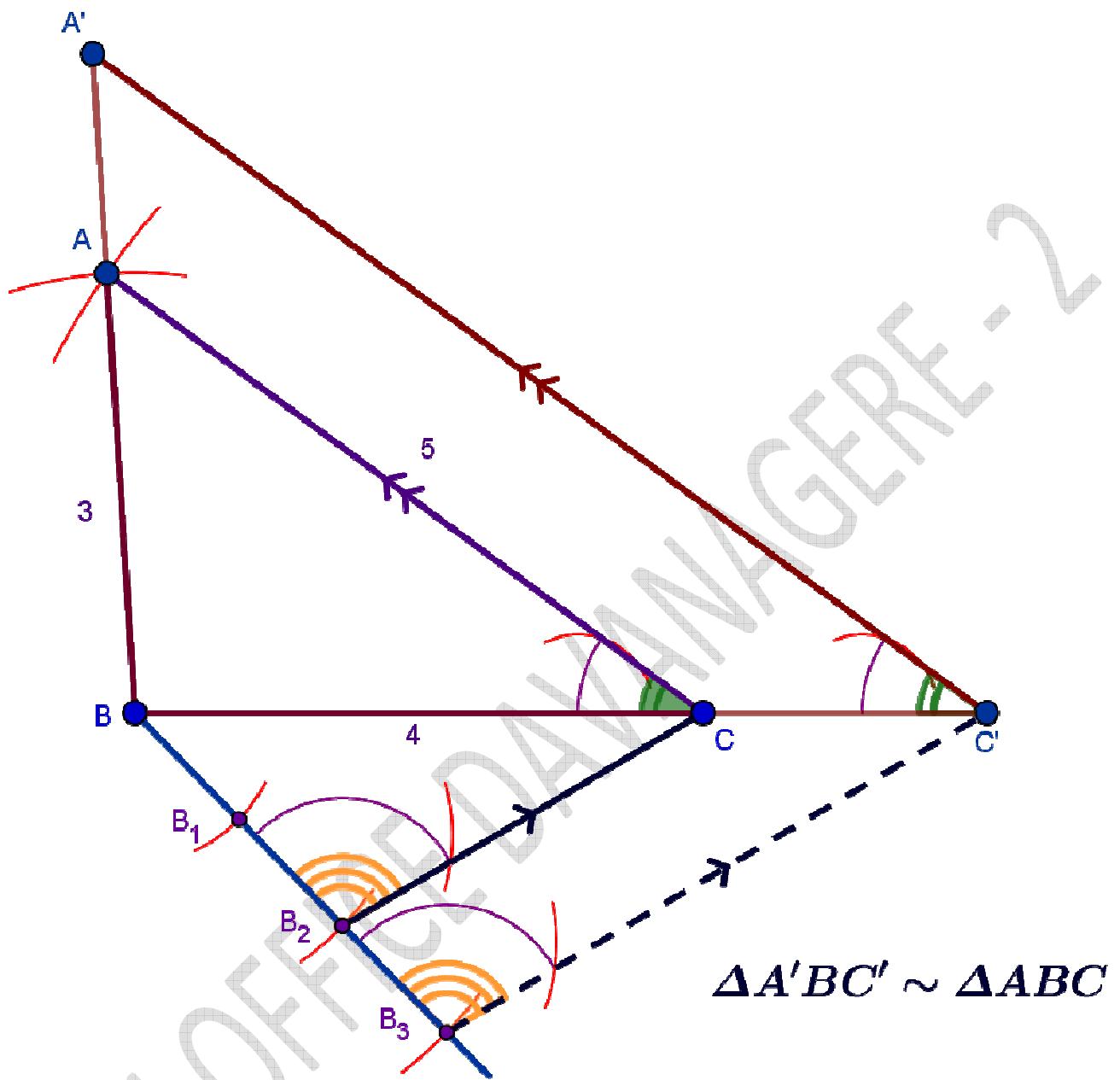
6) Draw a triangle ABC with sides of 3 cm, 4cm & 5cm. Then construct another triangle whose sides are  $\frac{5}{7}$  of the corresponding sides of the triangle ABC.



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.



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.



### 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
$\sum f_i = 35$		$\sum f_i x_i = 1340$	

$$\text{Mean} = \bar{X} = \frac{\sum f_i x_i}{\sum f_i}$$

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

$$= 38.28$$

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
$n = 60$	$\frac{n}{2} = 30, h = 10$	

$$\begin{aligned}\text{Median} &= \ell + \left[ \frac{\frac{n}{2} - cf}{f} \right] \times h \\ &= 20 + \left[ \frac{30 - 13}{20} \right] \times 10 \\ &= 20 + \left[ \frac{17}{2} \right] \\ &= 20 + 8.5 \\ &= 28.5\end{aligned}$$

3. Find the mode for the following distribution table.

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

$$\begin{aligned}\text{Mode} &= \ell + \left[ \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right] \times h \\ &= 60 + \left[ \frac{61 - 52}{2(61) - 52 - 38} \right] \times 20 \\ &= 60 + \left[ \frac{180}{32} \right] \\ &= 60 + 5.625 \\ &= 65.625\end{aligned}$$

4. Find the mean for the following distribution table.

C - I	$f_i$	$x_i$	$f_i x_i$
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
$\sum f_i = 100$		$\sum f_i x_i = 2980$	

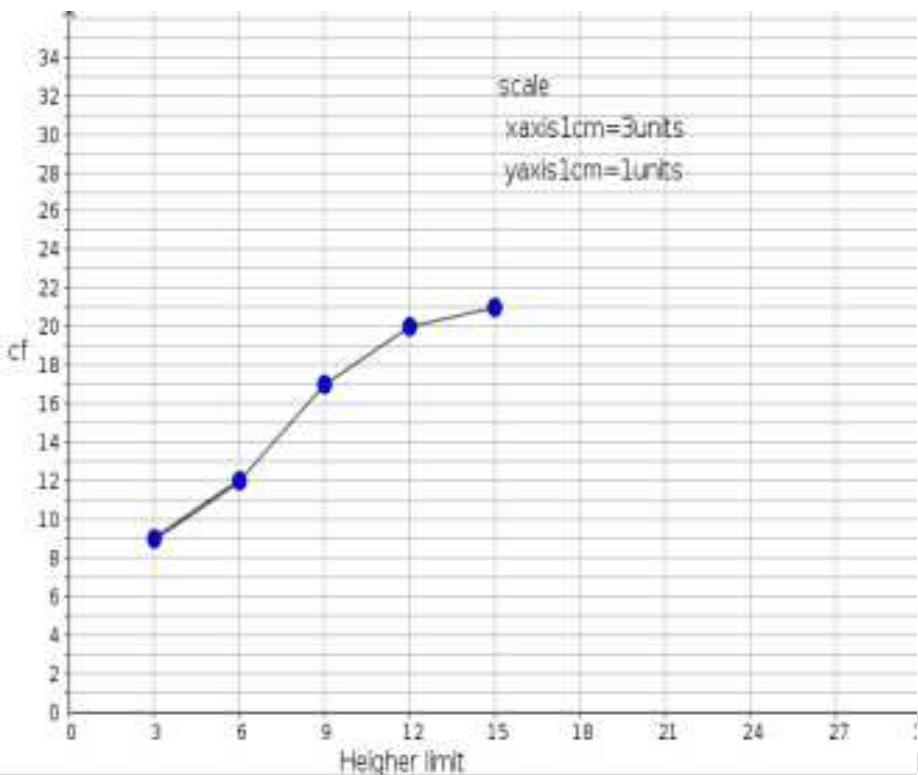
$$\begin{aligned}\text{Mean} &= \bar{X} = \frac{\sum f_i x_i}{\sum f_i} \\ &= \frac{2980}{100} \\ &= 29.8\end{aligned}$$

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

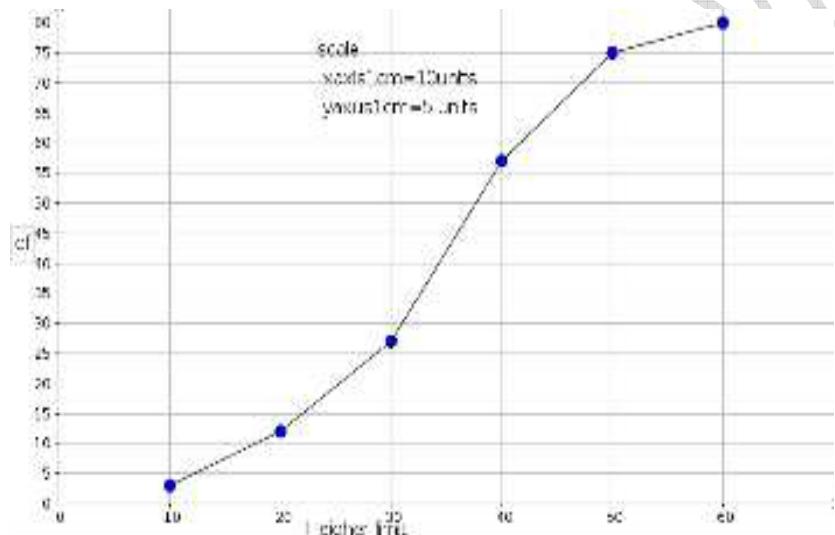
C - I	$f_i$	$x_i$	$f_i x_i$
0 – 2	1	1	1
2 - 4	2	3	6
4 – 6	1	5	5
6 - 8	5	7	35
8 – 10	6	9	54
$\sum f_i = 15$		$\sum f_i x_i = 101$	

$$\begin{aligned}\text{Mean} &= \bar{X} = \frac{\sum f_i x_i}{\sum f_i} \\ &= \frac{101}{15} \\ &= 6.734\end{aligned}$$

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



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.



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
$n = 100$	$\frac{n}{2} = 50$ ,	$h = 10$

$$\begin{aligned}
 \text{Median} &= \ell + \left[ \frac{\frac{n}{2} - cf}{f} \right] \times h \\
 &= 7 + \left[ \frac{50 - 36}{40} \right] \times 10 \\
 &= 7 + \left[ \frac{14}{4} \right] \\
 &= 7 + 3.5 \\
 &= 8.5
 \end{aligned}$$

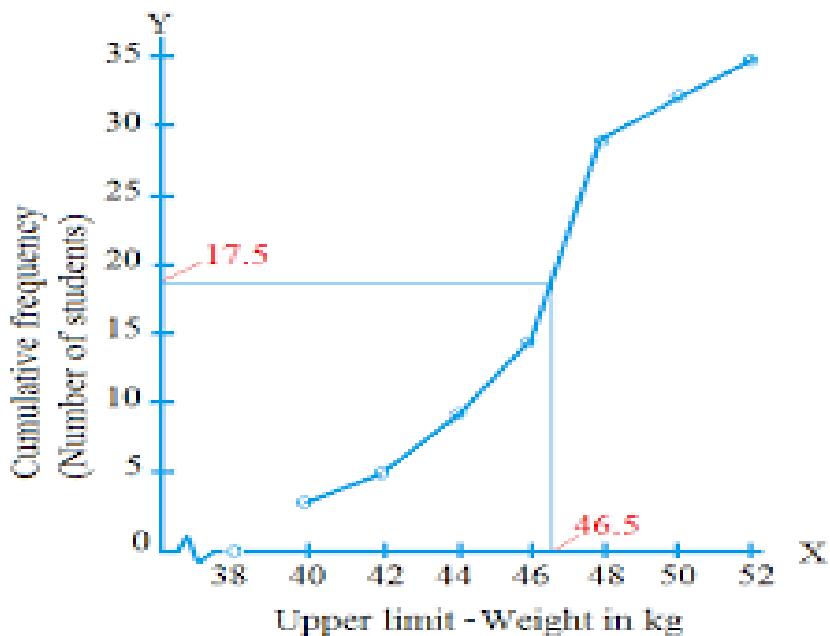
9. Find the median for the following distribution table.

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
$n = 30, \frac{n}{2} = \frac{30}{2} = 15, h = 15$		

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

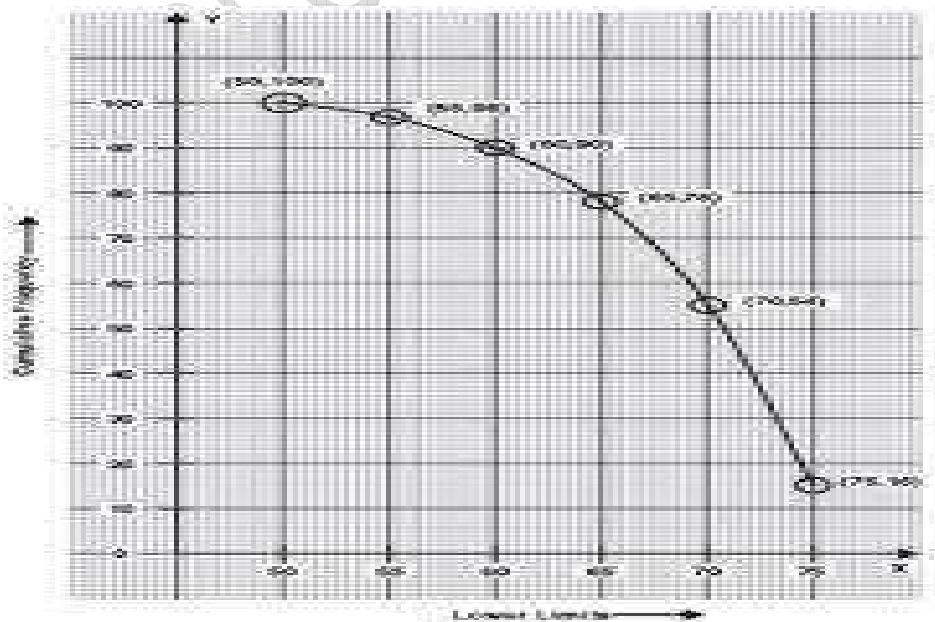
$$\begin{aligned}
 &= 40 + \left[ \frac{15 - 9}{6} \right] \times 15 \\
 &= 40 + \left[ \frac{6}{6} \right] \times 15 \\
 &= 40 + 15 \\
 &= 55
 \end{aligned}$$

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



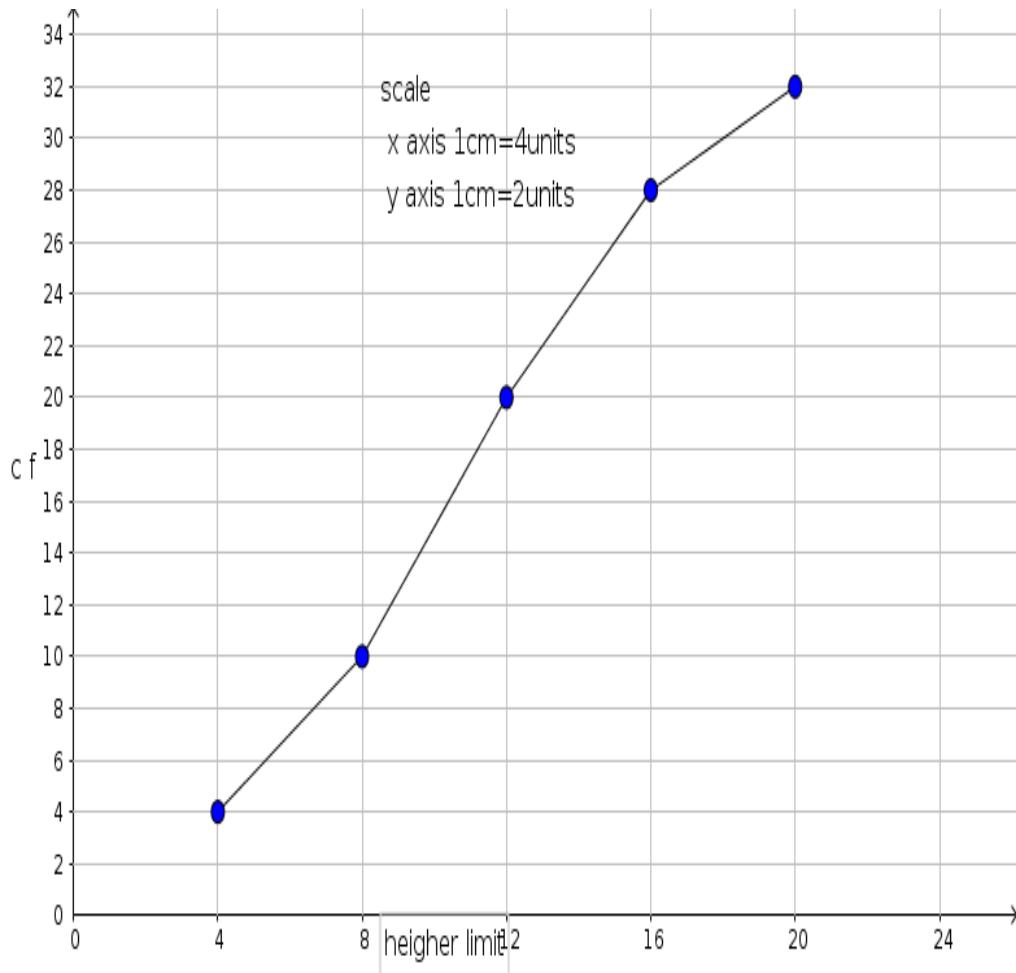
Weight (in kg)	No. of stds
less than 38	0
less than 40	3
less than 42	5
less than 44	9
less than 46	14
less than 48	28
less than 50	32
less than 52	35

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

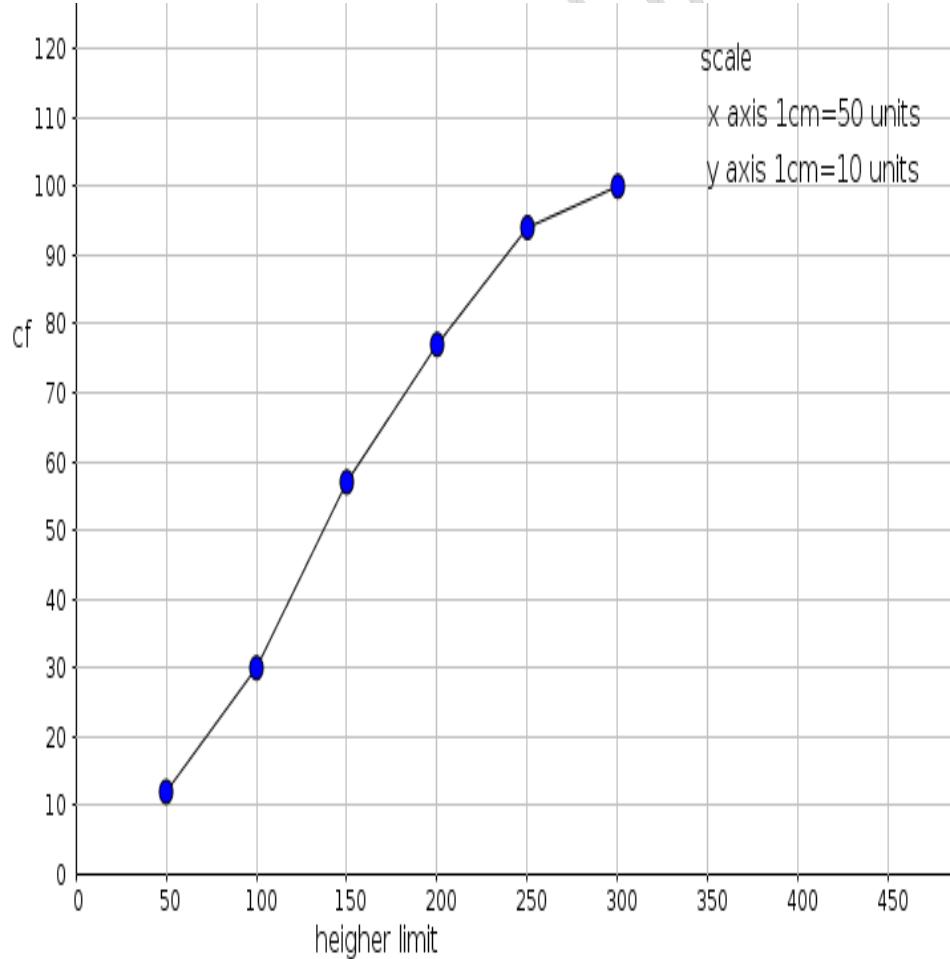


Yields	No. of yeilds	cf	(x, y)
50 - 55	2	100	(50, 100)
55 - 60	8	98	(55, 98)
60 - 65	12	90	(60, 90)
65 - 70	24	78	(65, 78)
70 - 75	38	54	(70, 54)
75 - 80	16	16	(75, 16)

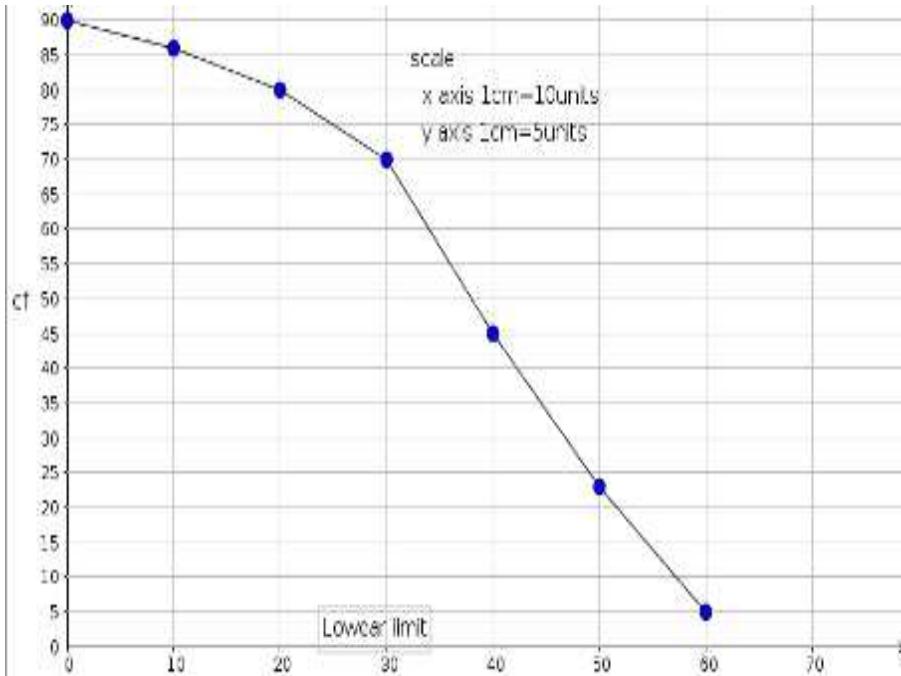
12. Draw less than type of Ogive for the below data.



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



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	

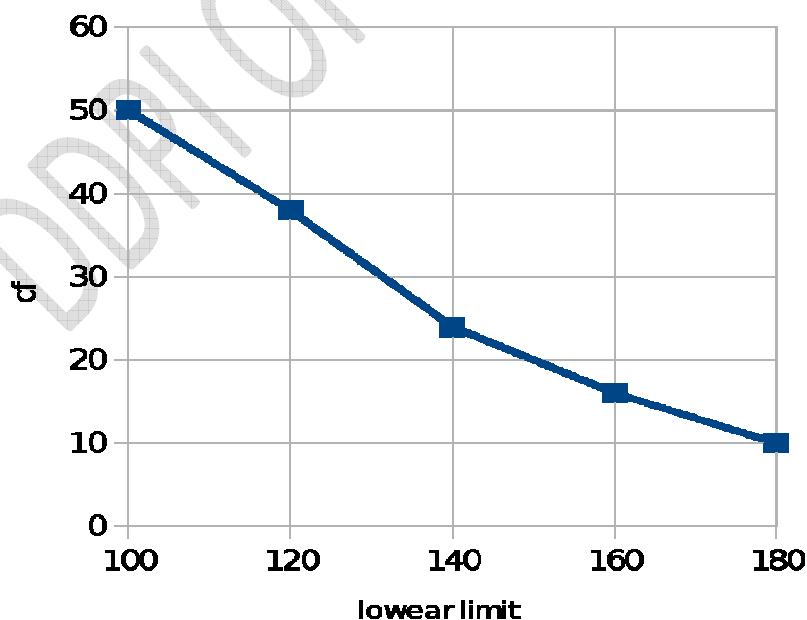
15) Find the median of the data collected by the survey report heights of 50 girls.

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
$n = 30, \frac{n}{2} = \frac{60}{2} = 30, h = 5$		

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

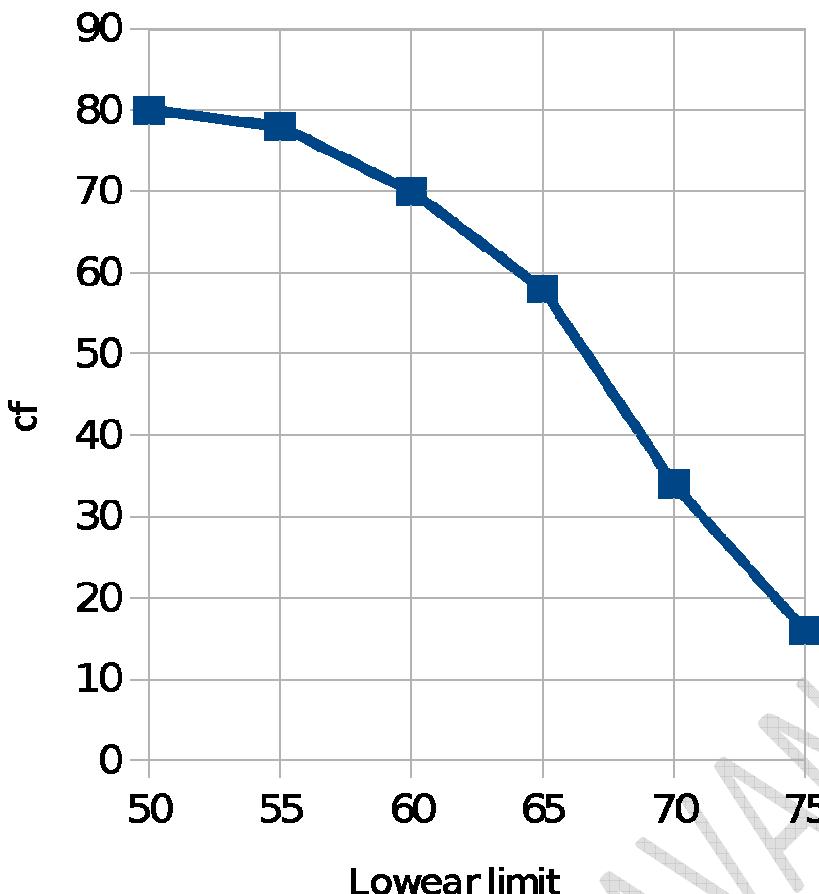
$$\begin{aligned}
 &= 145 + \left[ \frac{30 - 13}{19} \right] \times 5 \\
 &= 145 + \left[ \frac{17}{19} \right] \times 5 \\
 &= 145 + \left[ \frac{85}{19} \right] \\
 &= 145 + 4.47 \\
 &= 149.47
 \end{aligned}$$

16) Draw more than type of Ogive for the data

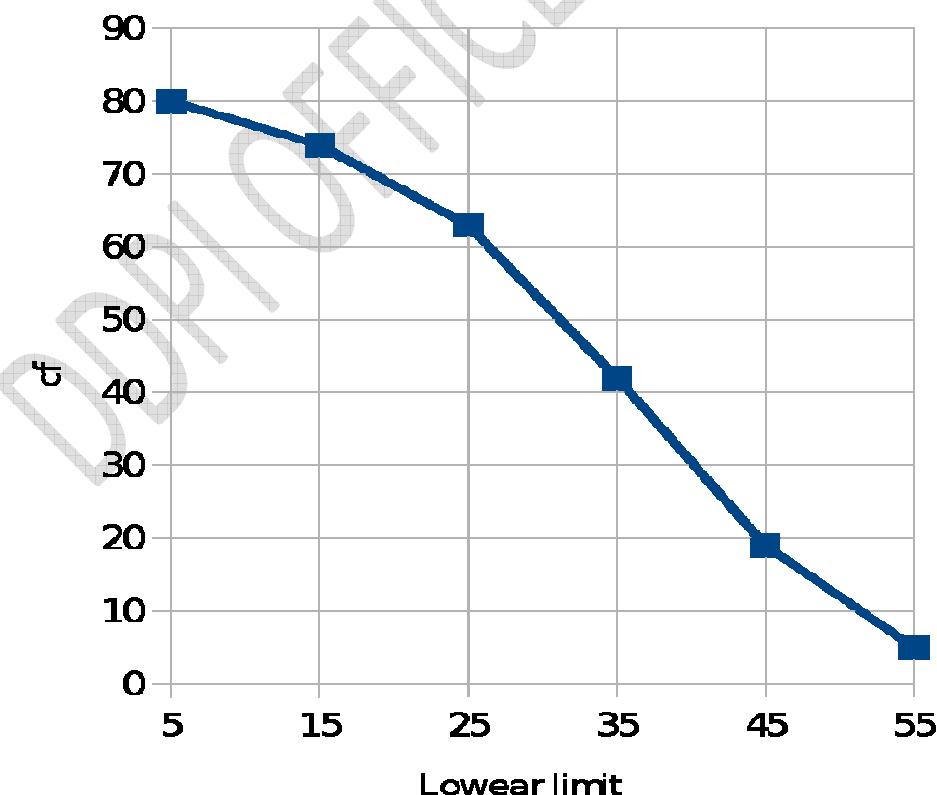


C.I.	f	cf	(x, y)
100 - 120	12	50	(100, 50)
120 - 140	14	38	(120, 38)
140 - 160	8	24	(140, 24)
160 - 180	6	16	(160, 16)
180 - 200	10	10	(180, 10)
		50	

17) Draw more than type of Ogive for the data



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

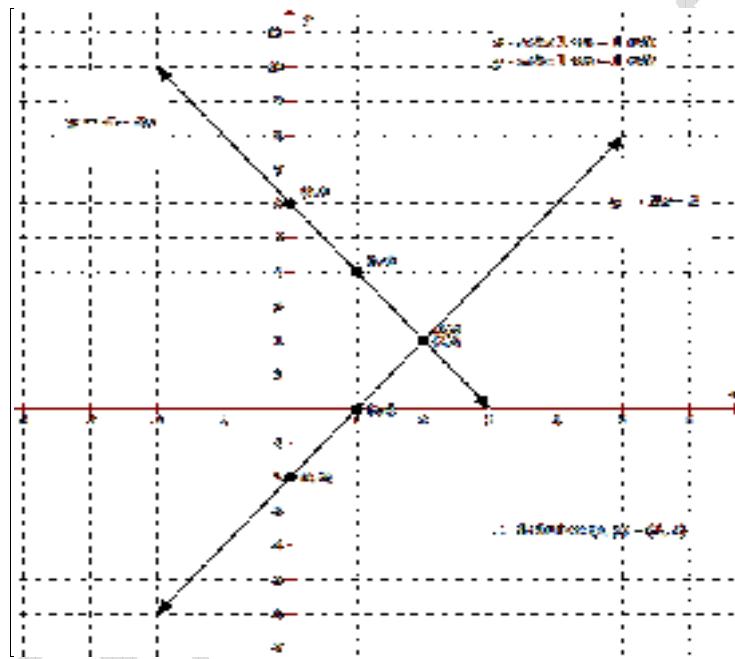


## 4 MARK QUESTIONS

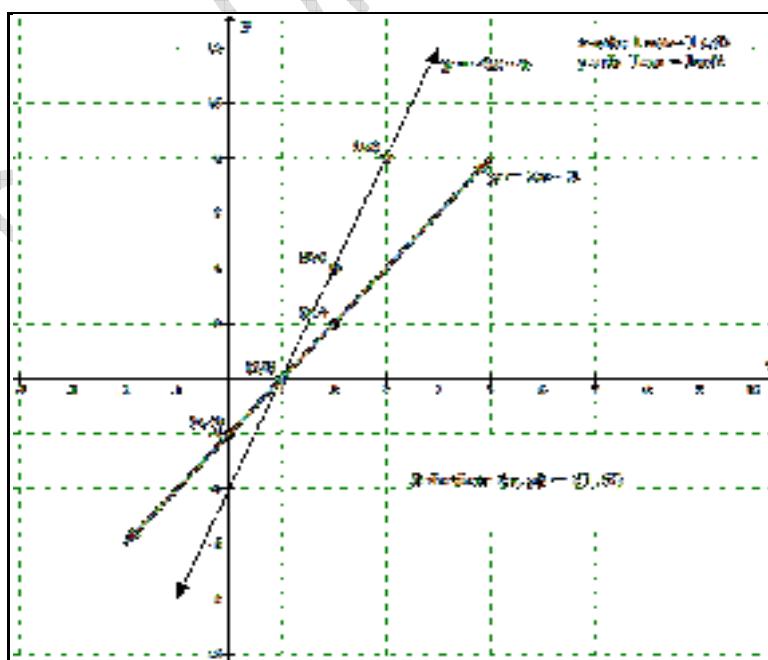
### UNIT : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

- A. Solve by 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)

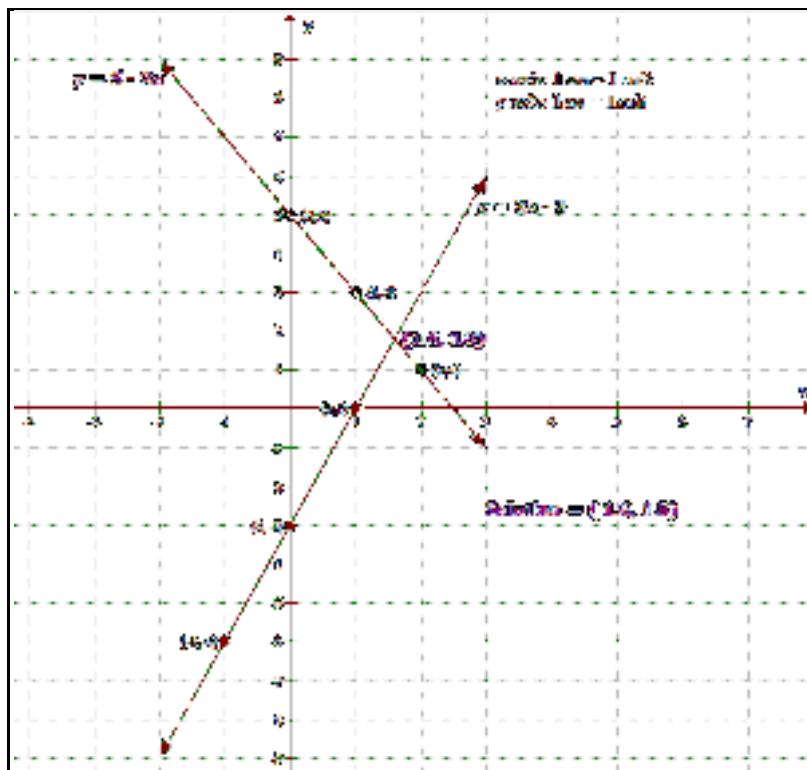


- B. Solve by graphically:  $y = 2x - 2$  and  $y = 4x - 4$



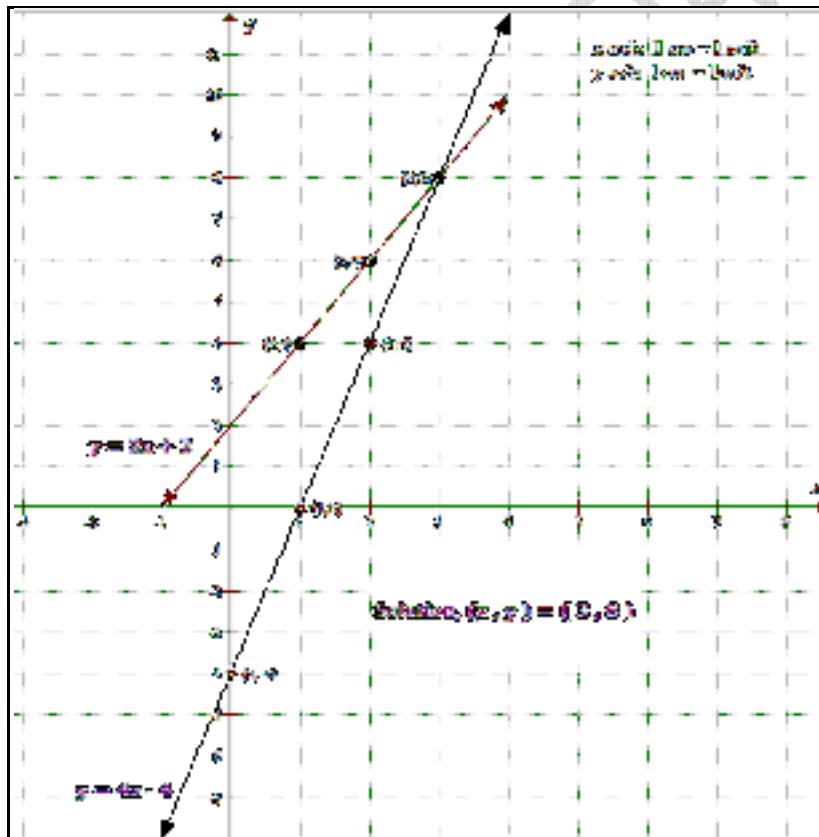
$x$	0	1	2
$y$	-2	0	2
( $x, y$ )	(0, -2)	(1, 0)	(2, 2)
$x$	1	2	3
$y$	0	4	8
( $x, y$ )	(1, 0)	(2, 4)	(3, 8)

C. Solve by graphically :  $y = 3x - 3$  and  $y = 5 - 2x$



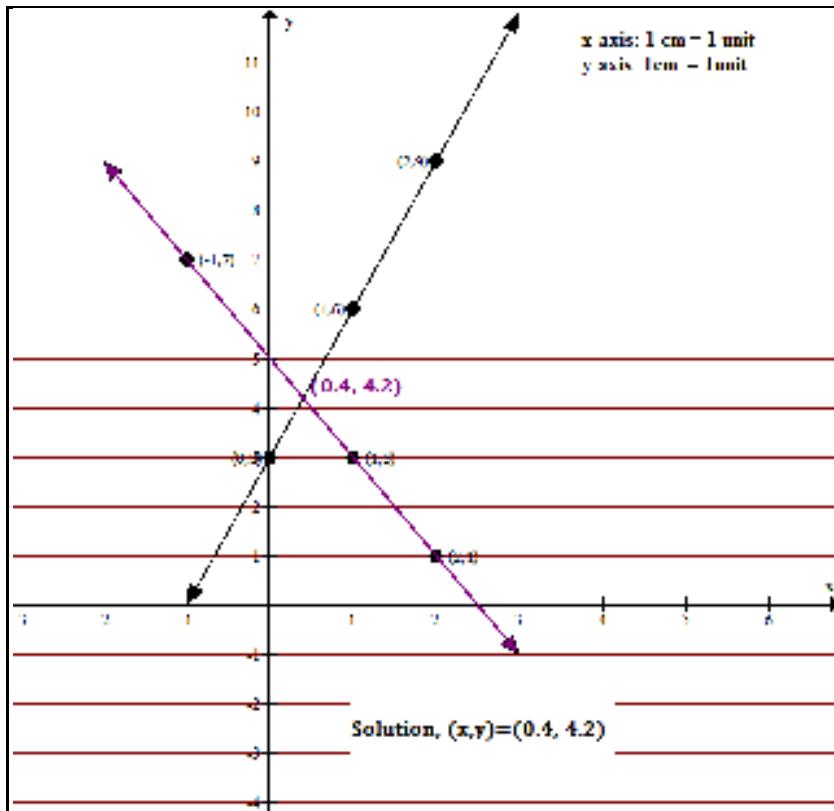
$x$	0	1	-1
$y$	-3	0	-6
$(x, y)$	(0, -3)	(1, 0)	(-1, -6)
$x$	0	1	2
$y$	5	3	1
$(x, y)$	(0, 5)	(1, 3)	(2, 1)

D. Solve by graphically :  $y = 2x + 2$  and  $y = 4x - 4$



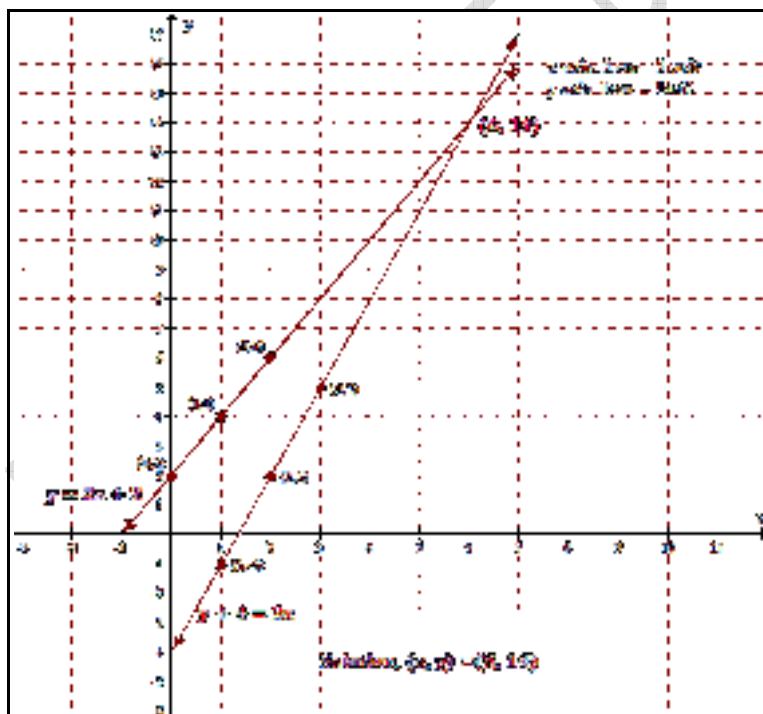
$x$	1	2	3
$y$	4	6	8
$(x, y)$	(1, 4)	(2, 6)	(3, 8)
$x$	0	1	2
$y$	-4	0	4
$(x, y)$	(0, -4)	(1, 0)	(2, 4)

E. Solve by graphically :  $y = 3x + 3$  and  $y = 5 - 2x$



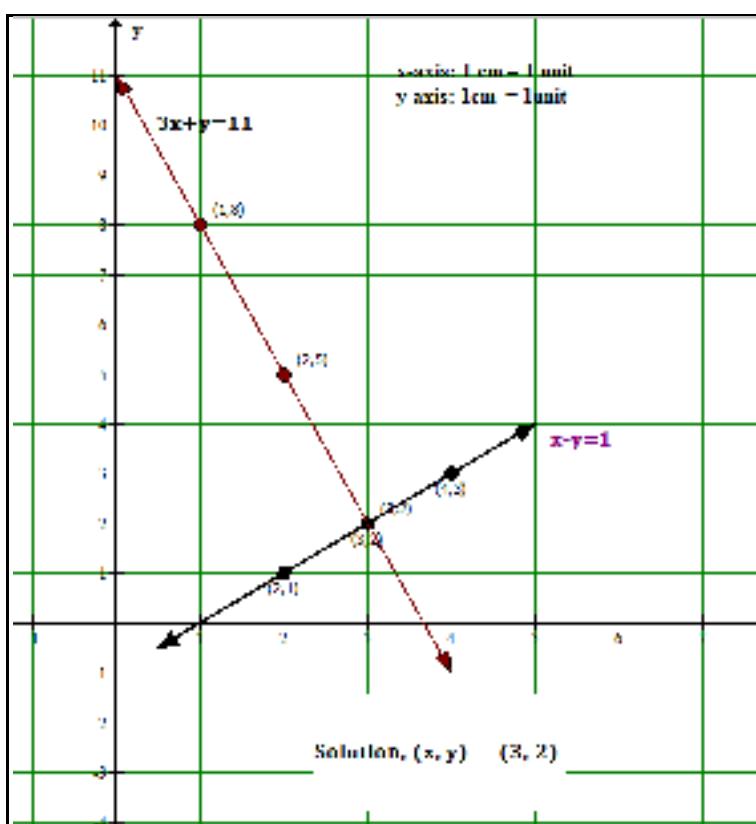
$X$	0	1	2
$y$	3	6	9
$(x, y)$	$(0, 3)$	$(1, 6)$	$(2, 9)$
$X$	1	2	-1
$y$	3	1	7
$(x, y)$	$(1, 3)$	$(2, 1)$	$(-1, 7)$

F. Solve by graphically :  $y = 2x + 2$  and  $y + 4 = 3x$



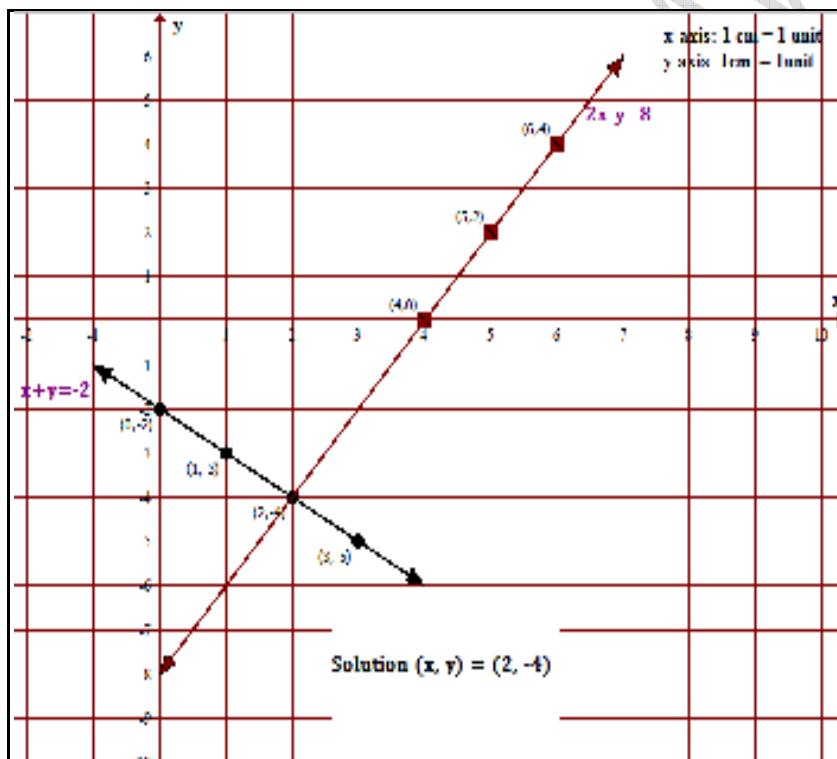
$X$	0	1	2
$y$	2	4	6
$(x, y)$	$(0, 2)$	$(1, 4)$	$(2, 6)$
$X$	1	2	3
$y$	-1	2	5
$(x, y)$	$(1, -1)$	$(2, 2)$	$(3, 5)$

G. Solve by graphically :  $3x + y = 11$  and  $x - y = 1$



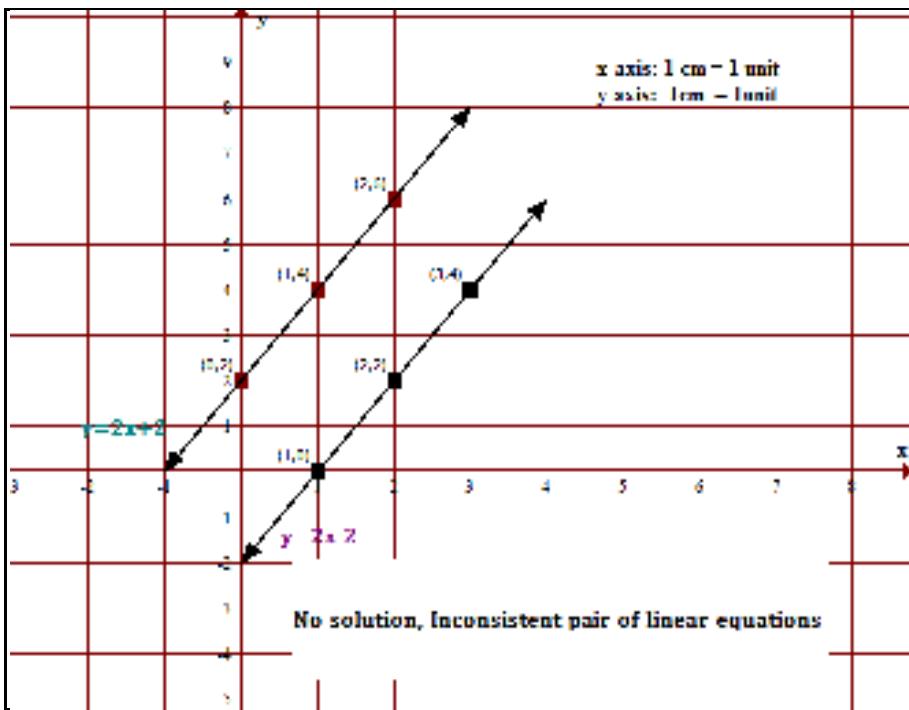
$x$	1	2	3
$y$	8	5	2
$(x, y)$	(1,8)	(2,5)	(3,2)
$x$	2	3	4
$y$	1	2	3
$(x, y)$	(2,1)	(3,2)	(4,3)

H. Solve by graphically :  $x + y = -2$  and  $2x - y = 8$



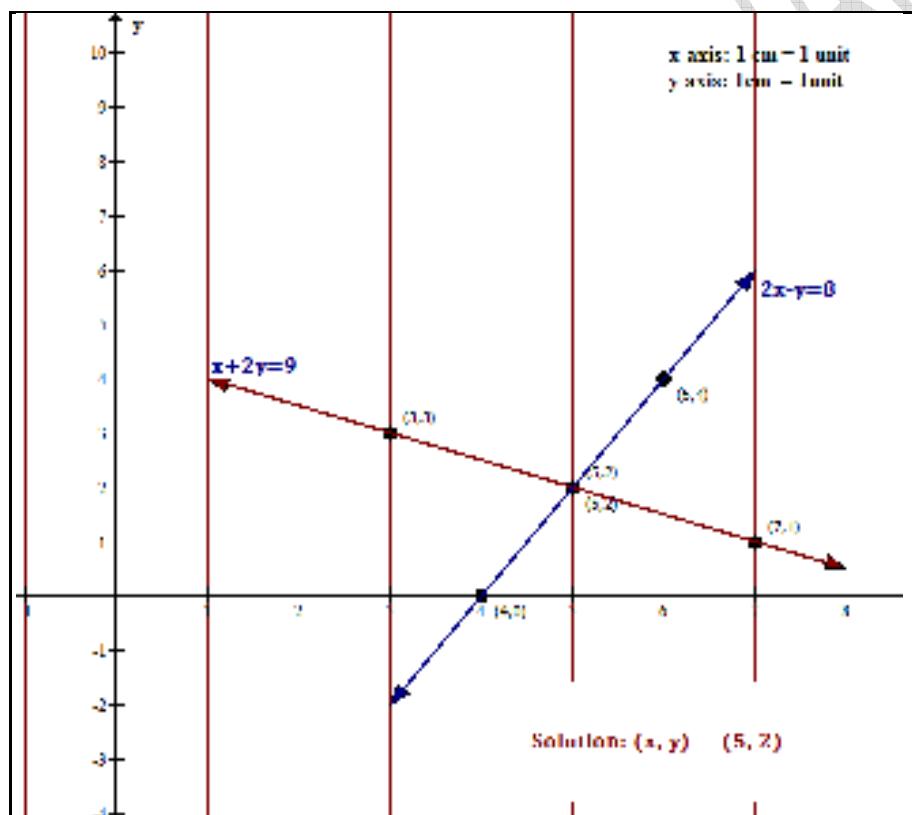
$x$	0	1	3
$y$	-1	-3	-5
$(x, y)$	(0, -2)	(1, -3)	(3, -5)
$x$	4	5	6
$y$	0	2	4
$(x, y)$	(4,0)	(5,2)	(6,4)

I. Solve by graphically :  $y = 2x - 2$  and  $y = 2x + 2$



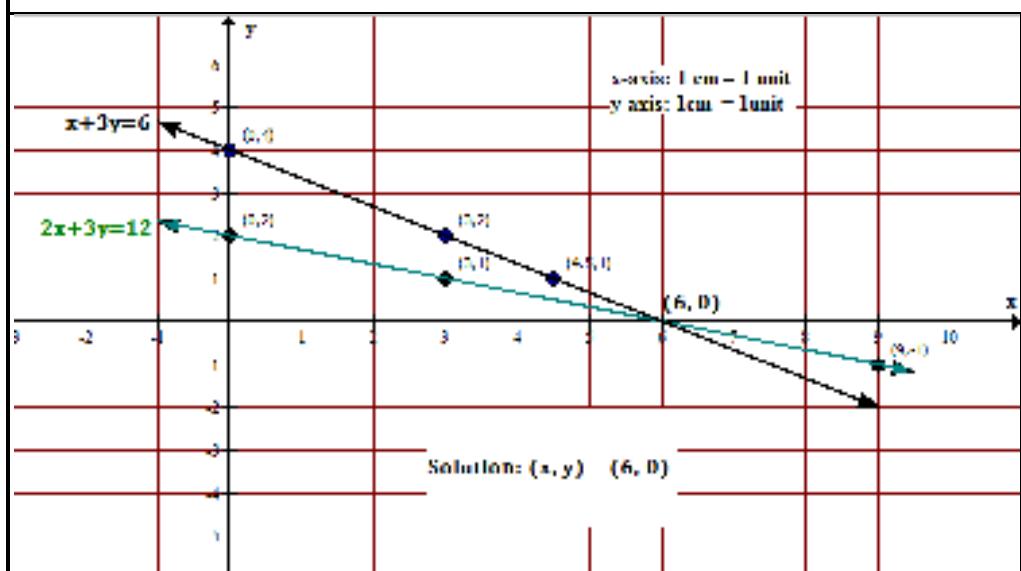
X	1	2	3
y	0	2	4
(x, y)	(1,0)	(2,2)	(3,4)
X	0	1	2
y	2	4	6
(x, y)	(0,2)	(1,4)	(2,6)

J. Solve by graphically :  $x + 2y = 9$  and  $2x - y = 8$



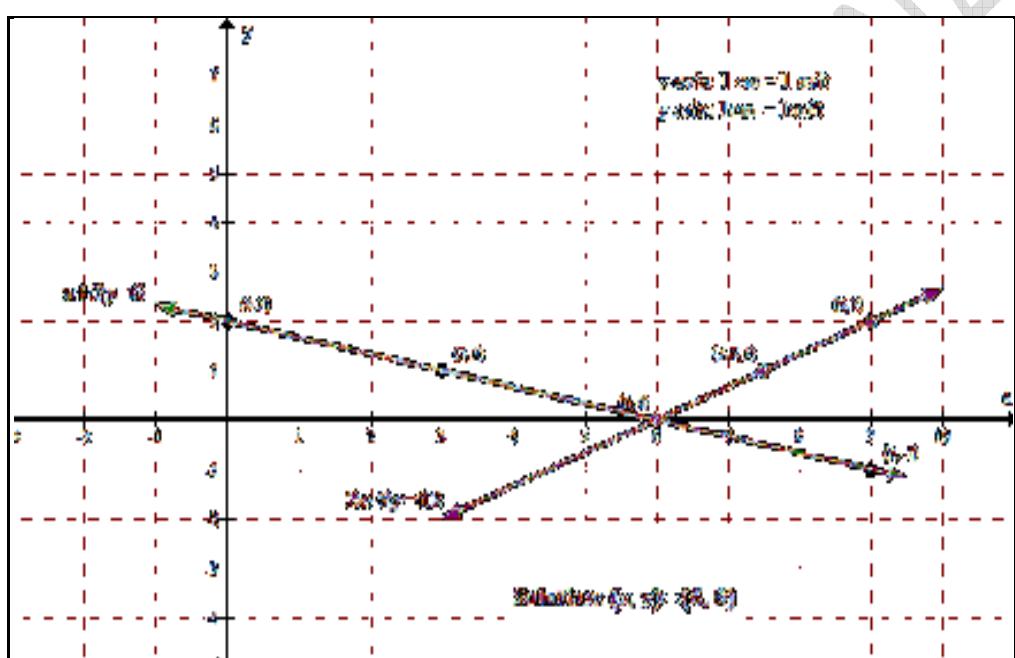
X	7	5	3
y	1	2	3
(x, y)	(1, 7)	(5, 2)	(3, 3)
X	4	5	6
y	0	2	4
(x, y)	(0,4)	(5,2)	(6,4)

K. Solve by graphically :  $x + 3y = 6$  and  $2x + 3y = 12$



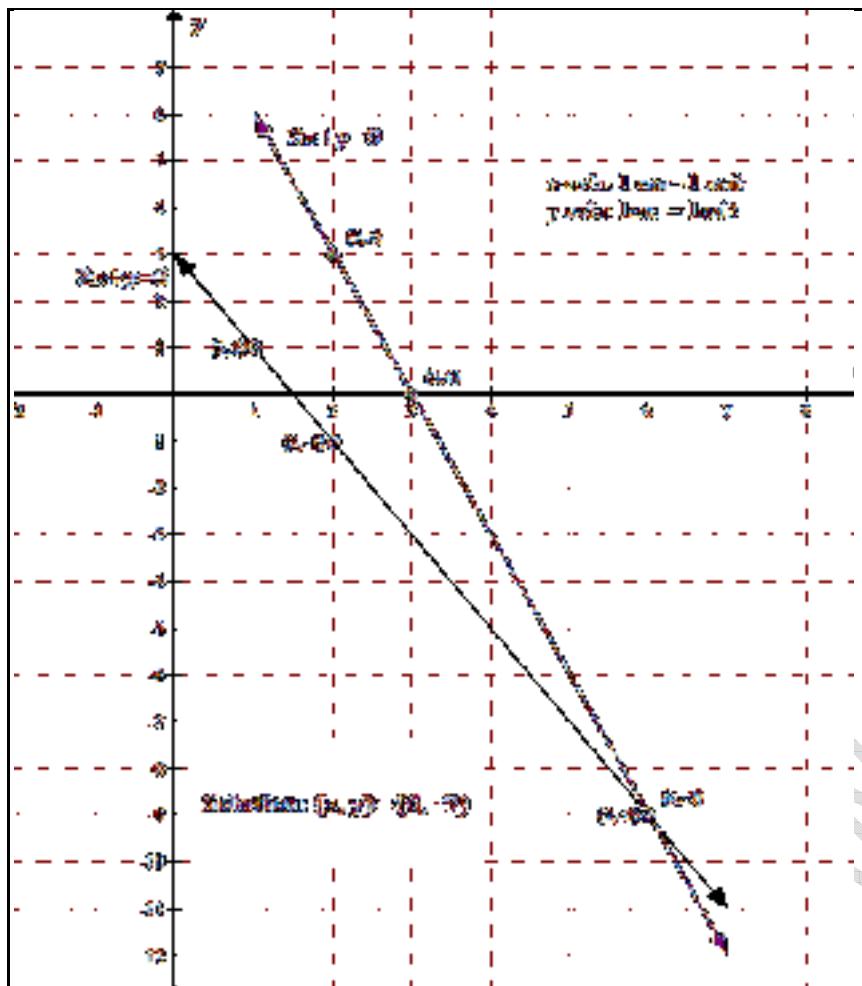
$x$	3	0	9
$y$	1	2	-1
$(x, y)$	(3, 1)	(0, 2)	(3, 3)
$x$	4.5	3	0
$y$	1	2	4
$(x, y)$	(4.5, 1)	(3, 2)	(0, 4)

L. Solve by 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 by 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  $\Delta ABC$ ,  $\angle ABC = 90^\circ$

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

Construction :  $BD \perp AC$

Proof : In  $\Delta ADB$  and  $\Delta ABC$

$$\angle ADB = \angle ABC = 90^\circ \quad (\text{Data and Construction})$$

$$\angle BAD = \angle BAC \quad (\text{Common angle})$$

$$AB = AB \quad (\text{Common side})$$

$$\Delta ADB \cong \Delta ABC \quad (\text{AA similarity criterian})$$

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

$$AD \cdot AC = AB^2 \dots\dots\dots(1)$$

In  $\Delta BDC$  and  $\Delta ABC$

$$\angle BDC = \angle ABC \quad (\text{Data and Construction})$$

$$\angle DCB = \angle ACB \quad (\text{Common angle})$$

$$\Delta BDC \cong \Delta ABC \quad (\text{A - A similarity criterian})$$

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

$$DC \cdot AC = BC^2 \dots\dots\dots(2)$$

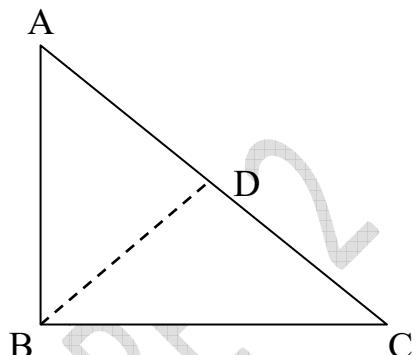
By adding (1) and (2)

$$AD \cdot AC + DC \cdot AC = AB^2 + BC^2$$

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

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

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



2. State and prove converse of Pythagoras theorem.

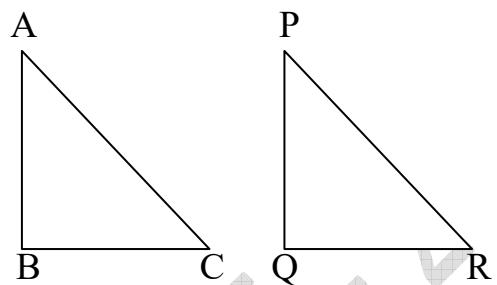
Statement: "In a triangle, if the square of one side of a triangle is equal to the sum of squares of the other two sides then the angle opposite to the first side is a right angle."

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

To Prove :  $\angle ABC = 90^\circ$

Construction : Construct  $\Delta PQR$ , right angled at Q

Such that  $PQ = AB$ , And  $QR = BC$



Proof: In  $\Delta PQR$

$$PR^2 = PQ^2 + QR^2 \quad (\text{By Pythagoras theorem as } \angle Q = 90^\circ)$$

$$PR^2 = AB^2 + BC^2 \dots\dots (1) \quad (\text{By Construction})$$

$$AC^2 = AB^2 + BC^2 \dots\dots (2) \quad (\text{By Data})$$

$$AC = PR \dots\dots (3) \quad (\text{From (1) And (2)})$$

Now, In  $\Delta ABC$  and  $\Delta PQR$

$$AB = PQ \quad (\text{By Construction})$$

$$BC = QR \quad (\text{By construction})$$

$$AC = PR \quad (\text{Proved in (3) above})$$

$$\text{So, } \Delta ABC \cong \Delta PQR \quad (\text{By SSS Congruence})$$

$$\angle B = \angle Q \quad (\text{By CPCT})$$

$$\text{But, } \angle Q = 90^\circ \quad (\text{By construction})$$

$$\text{So, } \angle B = 90^\circ$$

Hence proved.

## CIRCLE THEOREM - 1

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

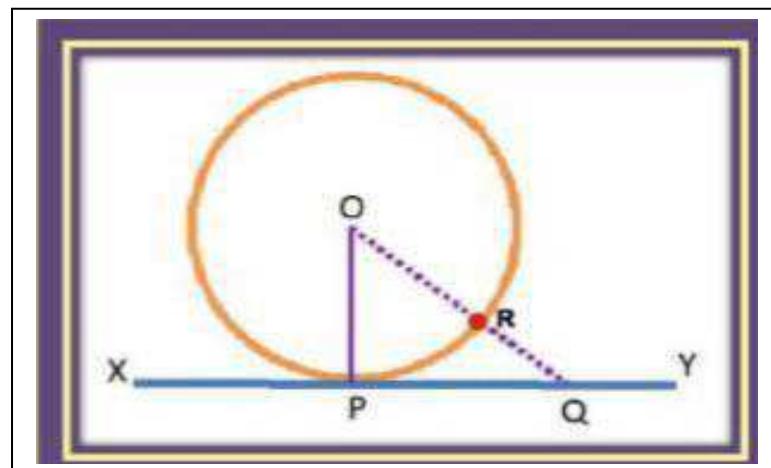
Data : XY is tangent

O is center of circle

P is point of contact

OP is radius of the circle

To Prove :  $OP \perp XY$



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 THEOREM - 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  $\Delta OBA$  And  $\Delta OCA$

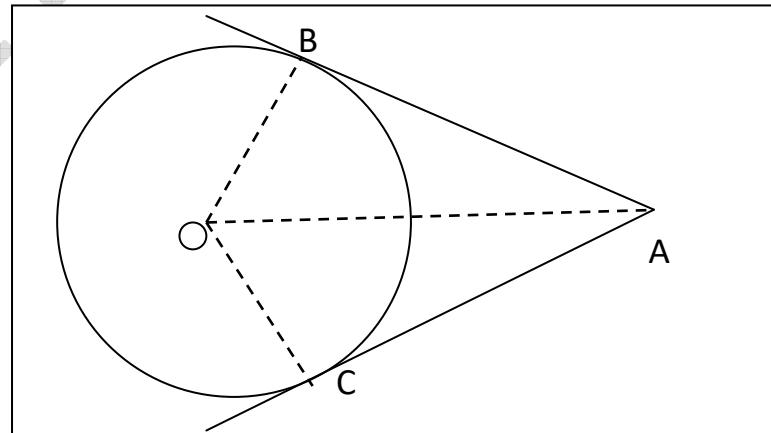
$OB = OC$  ( Radii of the same circle )

$OA = OA$  ( Common side )

$\angle OBA = \angle OCA = 90^\circ$  ( Radius  $\perp$  to tangents )

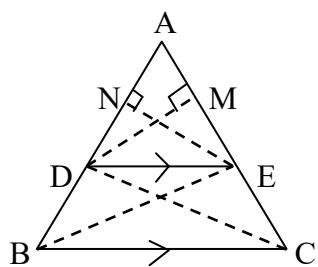
So,  $\Delta OBA \cong \Delta OCA$  ( RHS postulate )

$\therefore AB = AC$



## 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  $\triangle ABC$ ,  $DE \parallel BC$ .

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

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

PROOF : In  $\triangle ADE$  &  $\triangle BDE$

$$\begin{aligned}\frac{\text{Area of } \triangle ADE}{\text{Area of } \triangle BDE} &= \frac{\frac{1}{2} \times AD \times EN}{\frac{1}{2} \times DB \times EN} \\ &= \frac{AD}{DB} \dots\dots\dots(1)\end{aligned}$$

In  $\triangle ADE$  &  $\triangle CDE$

$$\begin{aligned}\frac{\text{Area of } \triangle ADE}{\text{Area of } \triangle CDE} &= \frac{\frac{1}{2} \times AE \times DM}{\frac{1}{2} \times EC \times DM} \\ &= \frac{AE}{EC} \dots\dots\dots(2)\end{aligned}$$

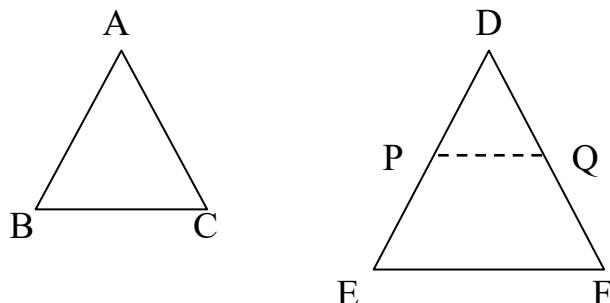
From (1) & (2),  $\therefore \frac{AD}{DB} = \frac{AE}{EC}$

$\because \text{Area of } \triangle BDE = \text{Area of } \triangle CDE$

In  $\triangle BDE$  &  $\triangle CDE$  are on the same base BC and between the same parallel BC & DE

## A – A CRITERIA THEOREM

**STATEMENT :** If in two  $\Delta$  <sup>les</sup>, corresponding angles are equal, then their corresponding sides are in the same proportion.



**DATA :** In  $\Delta ABC$  &  $\Delta DEF$

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

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

**CONSTRUCTION :** To draw  $PQ \parallel EF$

$$DP = AB, BC = PQ \text{ & } AC = DQ$$

**PROOF :** In  $\Delta ABC$  &  $\Delta DPQ$

$$AB = DP \text{ & } AC = DQ$$

[  $\because$  Construction ]

$$\angle A = \angle D$$

[  $\because$  DATA ]

$$\therefore \Delta ABC \cong \Delta DPQ$$

[  $\because$  S.A.S. postulate ]

$$\therefore \angle B = \angle P$$

[  $\because$  corresponding angles in similar triangles ]

$$\text{But, } \angle B = \angle E \quad [\because \text{DATA}]$$

$$\Rightarrow \angle P = \angle E$$

$$\therefore PQ \parallel EF$$

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

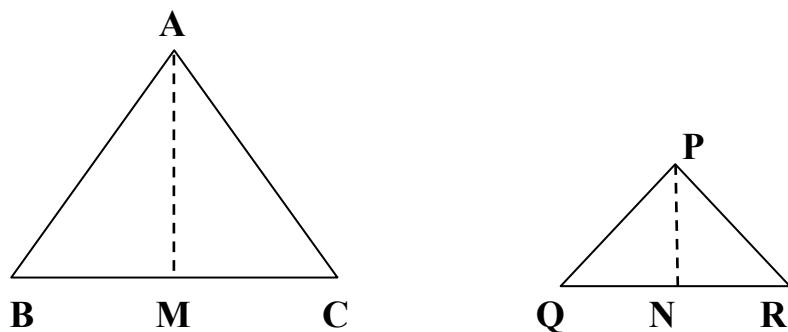
[  $\because$  Thales theorem ]

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

$$\therefore \Delta ABC \cong \Delta DEF$$

## 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  $\Delta ABC \sim \Delta PQR$

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

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

**CONSTRUCTION :** Draw  $AM \perp BC$  &  $PN \perp QR$ .

**PROOF :** In  $\Delta AMB$  &  $\Delta PNQ$

$$\angle B = \angle Q = 90^\circ \quad [\because \text{DATA}]$$

$$\angle AMB = \angle PNQ = 90^\circ \quad [\because \text{Construction}]$$

$$AB = PQ$$

$\Delta AMB \sim \Delta PNQ$  [A - A Criteria]

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

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

$$\therefore \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta PQR} = \frac{\frac{1}{2} \times BC \times AM}{\frac{1}{2} \times QR \times PN}$$

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