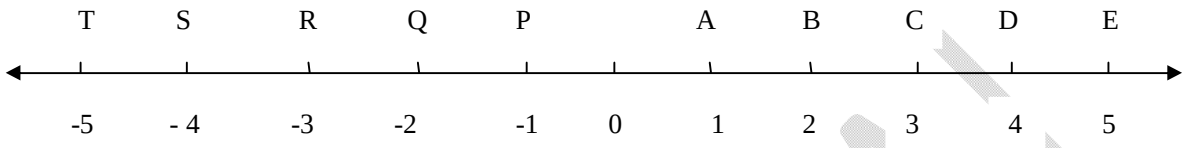
1. Basic Concepts in Geometry
Extra Questions

Q.1) Find the distances with the help of the number line given below (2 marks)



1)d (B, D)

Solution: Co- ordinate of point B is 2 and co-ordinate of point D is 4

d (B,D) = larger co-ordinate – smaller co-ordinate

= 4 – 2

= 2

∴ d (B, D) = 2 unit

Q. 2) d (B,Q)

Solution: Co-ordinate of point B is 2 and co-ordinate of point Q is -2

d (B, Q) = larger co-ordinate – smaller co-ordinate

= 2 – (-2)

= 2 + 2

= 4

∴ d (B, Q) = 4 unit

Q. 3) d (D, R)

Solution: co-ordinate of point D is 4 and co-ordinate of point R is -3

d (D,R) = larger co-ordinate – smaller co-ordinate

= 4- (-3)

=4+3

= 7

∴ d (D, R) = 7 unit

Q. 4) d (C, T)

Solution: co-ordinate of point C is 3 and co-ordinate of point T is -5

d (C,T) = larger co-ordinate – smaller co-ordinate

= 3 – (-5)

= 3 + 5

= 8

∴ d (C, T) = 8 unit

If the co-ordinate of A is x and that of B is y, find d (A,B)

Q.5) if the co – ordinate of A is x and that of B is y, find

d (A, B) (2 marks)

i)x= 1, y=3

Solution: co-ordinate of point A is 1 and co-ordinate of point B is 3

$\therefore d(A, B) =$ larger coordinate – smaller coordinate

$= 3 - 1$

$= 2$

$\therefore d(A, B) = 2$ unit

Q.6) x = -4 y=2

Solution: co-ordinate of point A is -4 and co-ordinate of point B is 2

$\therefore d(A, B) =$ larger co-ordinate – smaller co-ordinate

$= 2 - (-4)$

$=2+4$

$= 6$

$\therefore d(A, B) = 6$ unit

Q. 7) x = -3 y= 2

Solution: co-ordinate of point A is -3 and co-ordinate of point B is 2

$\therefore d(A, B) =$ larger co-ordinate – smaller co-ordinate

$= 2 - (-3)$

$=2+3$

$= 5$

$\therefore d(A, B) = 5$ unit

Q.8) x= 2, y= -7

Solution:

co-ordinate of point A is 2 and co-ordinate of point B is -7

$\therefore d(A, B)$ = larger co-ordinate – smaller co-ordinate

= 2 – (-7)

=2+7

= 9

$\therefore d(A, B) = 9$ unit

From the information given below, find which of the point is between the other two. If the points are not collinear, state so

(3 marks)

Q 9) d (P,R) = 3 d (R,Q)=11 d (P,Q)=8

Solution:

given ,d (P,R) = 3

d (R,Q) = 11

d (P,Q) =8

$\therefore d(P, Q) + d(P, R) = d(R, Q)$

point P,Q,R are collinear

point Q is between the point P and R i.e P-R-Q

Q.10) d (A,B) =5 d(B,C) = 15 d (A,C) = 20

Solution :

Given, d (A,B) = 5

d (B,C) = 15

d (A,C) = 20

∴ d (A, B) + d (B, C) = 5 + 15

= 20

d (A,C) = 20

∴ d (A, B) + d (B, C) = d (A, C)

∴ point A,B,C are collinear

point B is between the point A and C i.e A-B-C

Q.11) d (X,Y) = 19 d (Y,Z) =12 d (X,Z) =7

Solution:

Given, d (X, Y) =19

d (Y,Z) =12

d (X,Z) = 7

∴ d (Y, Z) + d (X, Z) = 12 + 7

= 19

d (X, Y) = 19

∴ d (Y, Z) + d (X, Z) = d (X, Y)

point X,Y,Z are collinear, point Z is between the point Y and X i.e Z – Y – X

Q.12) d (D,E) = 3 d (E,F) =8 d (D,F) =9

Solution:

Given, d (D,E) =3

d (E,F) =8

d (D,F) =9

$\therefore d(D,E) + d(E,F) = 3 + 8$

= 11

d (D,F) =9

$\therefore d(D,E) + d(E,F) \neq d(D,F)$

point D,E,F are non collinear

Q.13) On a number line, points A,B,C are such that

d (A,C)= 12, d (C,B) = 4 then find d (A,B) considering all possibilities (3 marks)

Case- 1

A – B – C

d (A,C) = d (A,B) + d (B,C)

12 = d (A,B)+4

12 - 4 = d (A,B)

8 = d (A,B)

∴ d (A,B) = 8 unit

case – II

A – C – B

d (A, B) = d (A, C) + d (C, B)

= 12 + 4

= 16

∴ d (A,B) = 16 unit

case – III

B – A – C

d (A, B) +d (A, C) = d (C, B)

d (A, B) + 12 = 4

d (A, B) = 4 – 12

d (A, B) = - 8 unit which is not possible

∴ point A is not between B and C

∴ d (A,B) = 8 unit and d (A,B) = 16 unit

Q. 14) On a number line, point P, Q and R are such that

d (P, R) = 7, d (R, Q) = 6 then find d (P, Q) considering all possibilities (3 marks)

case- I

P – Q – R

d (P, R) = d (P, Q) + d (Q, R)

7 = d (P, Q) + 6

7 – 6 = d (P, Q)

1 = d (P, Q)

∴ d (P,Q) = 1 unit

case -II

P – R – Q

d (P, Q) = d (P, R) + d (R, Q)

d (P, Q) = 7 + 6

d (P, Q) = 13

∴ d (P, Q) = 13 unit

case : III

P- Q – R

d (P, Q) + d (P, R) = d (Q, R)

d (P,Q) + 7=6

d (P, Q) =6 – 7

d (P, Q) = –1

∴ d (P, Q) = –1 unit ,which is not possible

∴ point P is not between Q and R

Q. 15) X – Y – Z are collinear point d (X, Y) = 7, d (Y, Z) = 3 then d (X, Y) find (3 marks)

case 1

X – Y – Z

d (X, Z) = d (X, Y) + d (Y, Z)

= 7 + 3

= 10

∴ d (X, Z) = 10 unit

case II

X – Z – Y

d (X, Y) = d (X, Z) + d (Z, Y)

7 = d (X, Z) + 3

7 - 3 = d (X, Z)

4 = d (X, Z)

∴ d (X, Z) = 4 unit

case III

Y – X – Z

d (X, Y) + d (X, Z) = d (Y, Z)

7 + d (X, Z) = 3

d (X, Z) = 3 – 7

d (X, Z) = – 4

∴ d (X, Z) = – 4 unit, which is not possible

∴ point X is not between y and z

∴ d (X, Z) = 10 unit, d (X, Z) = 4 unit

Q. 16) L – M – N are collinear points d (L, M) = 9,

d (M, N) = 6 then find d (L, N) = ? (3 marks)

Solution :

case I

L – M – N

d (L , N) = d (L, M) + d (M, N)

d (L, N) = 9+ 6

=15

∴ d (L, N) = 15 unit

case II

L – N – M

d (L, M) = d (L, N) + d (N, M)

9 = d (L, N) + 6

9 – 6 = d (L, N)

3 = d (L, N)

∴ d (L, N) = 3 unit

case III

M – L – N

d (L, M) + d (L, N) = d (M, N)

9 + d (L,N) = 6

d (L.N) = 6 – 9

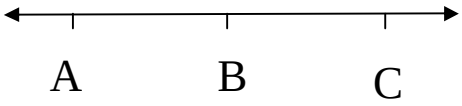
d (L.N) = -3, which is not possible

∴ d (L, N) = 15 unit and d (L,N) = 3 unit

Q. 17) Sketch proper figure and write the answers of the following questions (3 marks)

if A – B – C and l(AC)= 12, l (B, C) = 7.5 then find l (A, B)

Solution



Given,

A – B – C

l (A,C) = l (A, B) + l (B, C)

12 = l (A, B) + 7.5

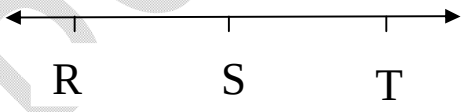
12 – 7.5 = l(A, B)

4.5 = l(A, B)

∴ l (A, B) = 4.5 unit

Q.18) If R – S – T and l (S, T) = 3.75, l(R, S) = 2.15 then find l(R, T) (2 marks)

Solution :



Given R – S – T

l(R, T) = l(R, S) + l(S, T)

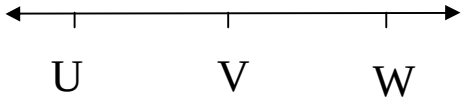
= 2.15 + 3.75

= 5.90

∴ l(R, T) =5.90 unit

Q.19) If U – V – W and l (U, W) = $4\sqrt{5}$, l (V, W) = $2\sqrt{5}$ then find l(U, V) (2 marks)

Solution



given, U – V – W

l (U, W) = l (U, V) + l (V, W)

$4\sqrt{5} = l$ (U, V) + $2\sqrt{5}$

$4\sqrt{5} - 2\sqrt{5} = l$ (U, V)

$2\sqrt{5} = l$ (U, V)

$\therefore l$ (U, V) = $2\sqrt{5}$ unit

The following table shows point an a number line and their co-ordinates. Decide whether the pair of segments given below the table are congruent or not (3 marks)

point	P	Q	R	S	T
co – ordinate	-2	6	3	-5	8

Q. 20) seg QS and seg PT

co-ordinate of point Q is 6 and co-ordinate of S is -5

length of segment QS = d (QS)

= larger co-ordinate – smaller co-ordinate

= 6 – (-5)

= 6+5

=11

co-ordinate of point P is -2 and co-ordinate of point T is 8

length of segment PT = d (P, T)

= larger coordinate - smaller coordinate

= 8 – (-2)

= 8 + 2

= 10

∴ d (Q, S) ≠ d (P, T)

seg QS and seg PT are not congruent

Q. 21) Seg ST and Seg PQ

coordinate of point S is – 5 and coordinate of the point T is 8

length of segment ST = d (ST)

= larger coordinate – smaller co ordinate

= 8 – (-5)

= 8 + 5

= 13

co – ordinate of point P is – 4 and co – ordinate of point Q is 6
length of segment PQ = d (P, Q)

= larger coordinate – smaller coordinate

= 6 – (-2)

= 6 + 2

= 8

Q. 22) seg PQ and seg RS

co – ordinate point P is – 2 and co – ordinate of the point Q is 6

length of segment PQ = d (P, Q)

= larger co – ordinate – smaller co – ordinate

= 6 – (-2)

= 6 + 2

= 8

co – ordinate point of R is 3,and co – ordinate point of s is -5

length of segment RS = d (R, S)

= large co – ordinate – small co – ordinate

= 3 – (-5)

= 3 + 5

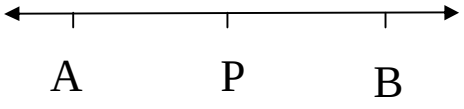
= 8

∴ d (P, Q) = d (R, S)

∴ seg PQ and seg RS are congruent i.e seg PQ ≅ seg RS

Q. 23) point P is the midpoint of seg AB. If AB then find AP

solution :



point p is the midpoint of seg AB

$\therefore AP = BP = \frac{1}{2} AB$

$= \frac{1}{2} \times 7$ .....(AB = 7)

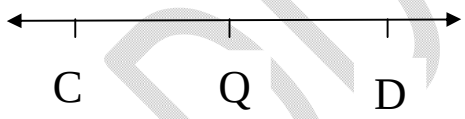
$= \frac{7}{2}$

$= 3.5$

$\therefore AP = 3.5$ cm unit

Q. 24) point Q is the midpoint of seg CD ,if CQ = 6 cm ,then find CD ? (2 marks)

solution :



point Q is the midpoint of CD

$\therefore CQ = QD = \frac{1}{2} CD$

$6 = \frac{1}{2} CD$

$12 = CD$

$12 = CD$

$\therefore CD = 12$ cm unit

Q. 25) If AB = 5 cm, BP = 2 cm, AP = 3.4 cm then compare

the segment (3 marks)

solution:

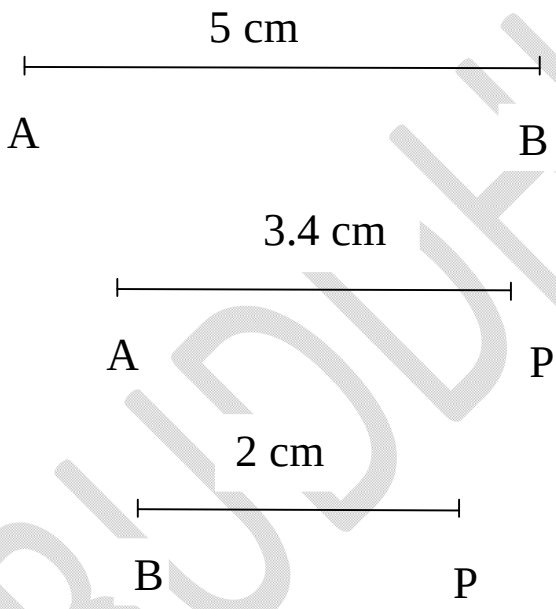
AB = 5 cm BP = 2 cm AP = 3.4 cm

Here, 5 > 3.4 > 2

means, 2 is greater than 3.4 and 3.4 greater than 5

∴ AB > AP > BP

means seg AB > seg AP > seg BP



Q. 26) If PQ = 10.5 cm, QS = 15 cm and ST = 7 cm then compare the segments (3 marks)

solution: PQ = 10.5 cm QS = 15 cm ST = 7 cm

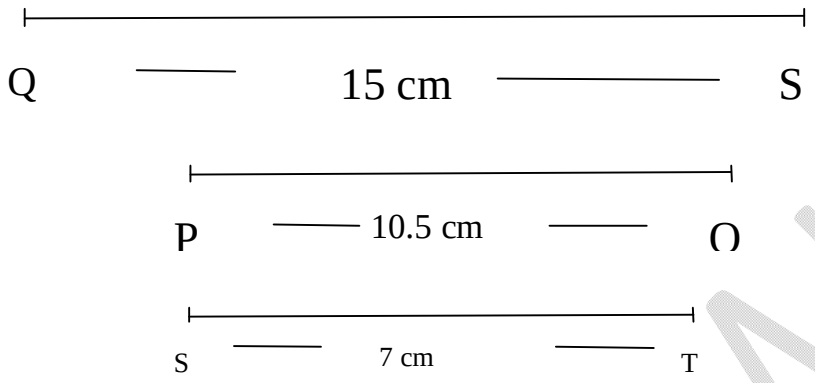
Here,

15 > 10.5 > 7

Means 7 is greater than 10.5 and 10.5 greater than 15

∴ QS > PQ > ST

Means, Seg QS > seg PQ > seg ST



On a number line co-ordinate of A,B,C are 4, - 7, 8 respectively. State with reason whether the following statements are true or false (2 marks)

d (A, B) + d (B, C) = d (A, C)

solution : Given is , A = 4 B = -7, C = 8

first let us, find the d (A, B), d (B, C), d (A, C)

∴ d (A, B) = (larger co – ordinate) –(smaller co – ordinate)

= 4 – (-7)

= 4 + 7

= 11

d (B, C) = large co – ordinate – small co – ordinate

= 8 – (-7)

= 8 + 7

= 15

d (A, C) = (large co – ordinate) – (small co – ordinate)

= 8 - 4

= 4

Q. 27) d (A, B) + d (B, C) = d (A, C)

solution: d (A,B) + d (B, C) = 11 + 15 =26

d (A, C) = 4

∴ d (A, B) + d (B, C) ≠ d (A, C)

∴ d (A, B) + d (B, C) = d (A, C) this statement are false

Q. 28) d (C, A) + d (A, B) = d (C, B)

solution: d (C, A) + d (A, B) = 4 + 11

d (C, B) = 15

∴ d (C, A) + d (A, B) = d (C, B)

∴ This statement are true

Q. Co-ordinate of some pairs of points are given below. Hence find the distance between each pair (2 marks)

29) -4 , 11

Solution: A = - 4 B = 11

∴ d (A, B) = larger co – ordinate – smaller co – ordinate

= 11 – (-4)

= 11 + 4

= 15

Q. 30) x + 8, x – 8

solution : A = x + 8, B = x – 8

∴ d (A, B) = (larger co – ordinate) –(smaller co – ordinate)

= (x + 8) – (x - 8)

= x + 8 – x + 8

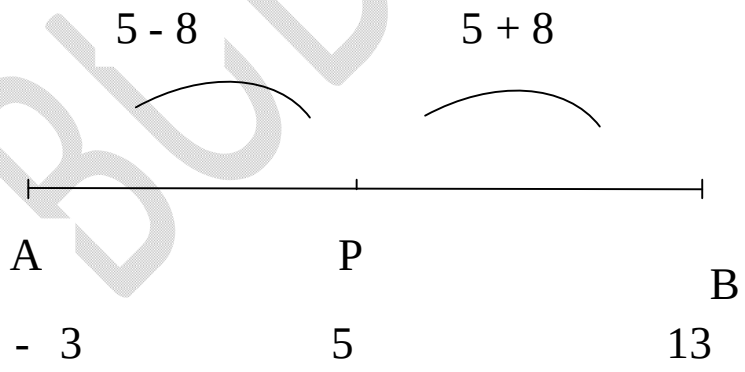
= 8 + 8

=16

Q. 31) co-ordinate of point P on a number line is 5 find the co-ordinate of points on the number line which are at a distance of 8 units from point P (3 marks)

solution:

As shown below in the figure ,let us ,take points A and B to the left and right of P respectively at a distance of 8 units



The co-ordinate of point A, which is to the left of P, will be 5 – 8 = -3

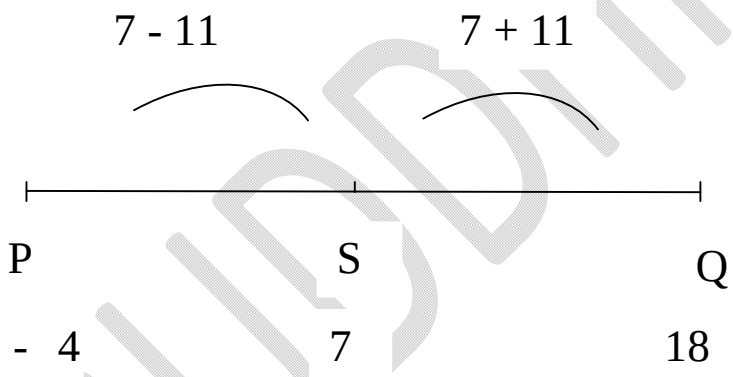
The co-ordinate of point 8, which is to the right of P, will be 5 + 8 = 13

∴ The co-ordinate of points 8 units away from P will be – 3 and 13

Q. 32) Co – ordinate of points S on a number line is 7. Find the co – ordinates of points on the number line which are at a distance of 11 units from point S (3 marks)

Solution:

As shown in the figure let us take points P and Q to the left and right of S respectively at a distance of 7 units

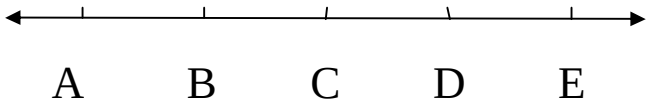


The co –ordinate of point P, which is to the left of S, will be 7 – 11 = - 4

The co – ordinate of of point Q which is to the right of S, will be 7 + 11 = 18

∴ The co – ordinate of points 11 units away from S will be – 4 and 18

Q. 33) write the answers to the following question with reference to figure (3 marks)



i) write the name of the opposite ray of ray CD

solution: ray CB or ray CA

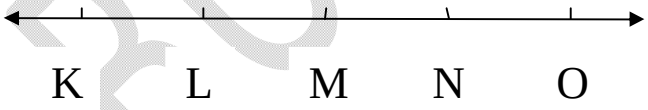
ii) write the intersection set of ray DE and ray CD

solution: The intersection set of ray DE and ray CD is ray DE

iii) write the union set of seg PQ and seg QR

solution: seg EC

Q. 34) write the answer to the following questions with reference to figure(3 marks)



i) state the rays of which seg OM is a subset

solution: Ray OM and ray MO

ii) write the pair of opposite rays with common end point M

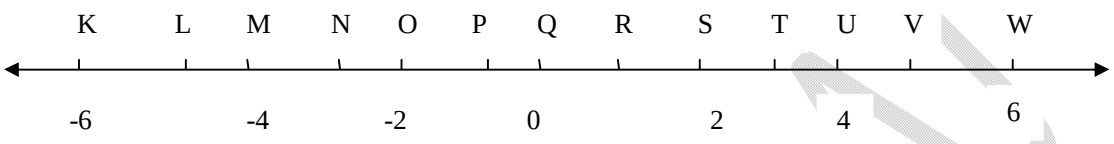
solution: Ray ML and Ray MO

Ray Mk and Ray MN

iii) write any two rays with common end point L

solution: Ray LK and Ray LM

Q. 35) Answer the following question with the help of figure



i) state the points which are equidistant from from point S (2 marks)

solution: points equidistant from point S are co – ordinate point of S is 2 and co – ordinate of point Q is = 0

d (S, Q) == large co – ordinate – small co – ordinate

= 2 – 0

= 2

co – ordinate of S is 2 and co – ordinate of U is 4

∴ d (S, U) =(larger co – ordinate) –(smaller co – ordinate)

= 4 – 2

= 2

∴ d (S, Q) = d (S, U)

∴ point equidistant from point S are point Q and point U

ii) write a pair of points equidistant form point Q (3 marks)

solution:

co – ordinate of point M is -4, co – ordinate of O is -2 and co – ordinate of K is -6

∴ d (M, O) = (larger co – ordinate) – (smaller co – ordinate)

= - 2 –(- 4)

= - 2 + 4

= 2

∴ d (M, K) =(larger co – ordinate) – (smaller co – ordinate)

= - 4 –(- 6)

= - 4 + 6

= 2

∴ point equidistant from point Q are point O and point K

iii) Find d (U, V) , d (P,C), d (V, B), d (U, L) (3 marks)

solution: U = -5 V = 5

co-ordinate of point L is -5 and co-ordinate of V is 5

d (L, V) = (larger co – ordinate) – (smaller co – ordinate)

= 5 –(- 5)

= 5 + 5

= 10

ii) O = -2 V = 4

co-ordinate of point O is -2 and co-ordinate of V is 4

d (O, U) = (larger co – ordinate) –(smaller co – ordinate)

= 4 – (- 2)

= 4 + 2

= 6

iii) V = 5 S = 2

co-ordinate of point V is 5 and co – ordinate of S is 2

d (V, S) = (larger co – ordinate) – (smaller co – ordinate)

= 5 – 2

= 3

iv) L = -5 N = -3

co-ordinate of point L is – 5 and co – ordinate of N is – 3

d (L, N) =(larger co – ordinate) – (smaller co – ordinate)

= - 3 – (- 5)

= - 3 + 5

= 2

write the following statement in If – then from (1 mark each)

Q. 36) All sides of rhombus are congruent

solution: If the quadrilateral is a rhombus, then all sides are congruent

Q. 37) If two parallel line are intersected by a transversal, the corresponding angles formed are congruent

solution: If two parallel lines are intersected by a transversal then the corresponding angles are congruent.

Q. 38) In a right angled triangle, the length of the side opposite to the angle of 30^0 is half of the hypotenuse

solution: If a right angled triangle, the measure of one angle is 30^0 then the length of the side opposite to it is half of the hypotenuse.

write converse of the following statements. (1 mark each)

Q. 39) The diagonals of a square root are congruent and perpendicular bisector of each other.

solution: If a quadrilateral is a square, then its diagonals are congruent and bisect each other.

Q. 40) If the opposite sides of a quadrilateral are congruent, then it is a parallelogram

solution: If a quadrilateral is parallelogram then its opposite sides are congruent.

Q.41) Sides opposite to congruent angles are congruent

solution: opposite angles to congruent sides are congruent.

Write the following statement in conditional form

(1 mark each)

Q. 42) The diagonals of a parallelogram bisect each other

solution: If the quadrilateral is parallelogram then diagonals of it bisect each other.

Q. 43) The opposite angles formed by two intersecting lines are of equal measure

solution: If the two lines are intersecting then opposite angle formed are of equal measure

Q. 44)If a quadrilateral is parallelogram then its opposite side are congruent

solution: If the opposite sides of a quadrilateral are congruent then it is a parallelogram

write the antecedent (given part) and the consequent (part to proved) in the following statement. (2 marks)

Q. 45) If two angles of a triangle are congruent, then the side opposite to those angles are congruent

solution:

Antecedent – Two angles of a triangle are congruent

In ΔABC , $\angle B \cong \angle C$

consequent: side AC ≅ side AB

Draw a labeled figure showing information in each of the following statements and write the antecedent and the consequent (3 marks)

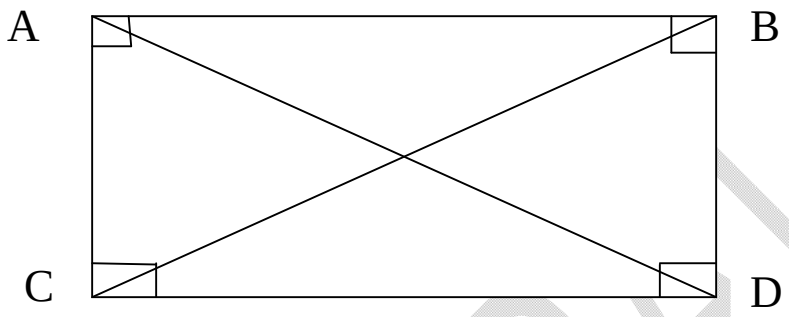
Q.46) The diagonals of a rectangle are congruent

solution:

Antecedent: □ ABCD is a rectangle seg AC and

consequent : diagonal AC ≅ diagonal BD

Diagram:



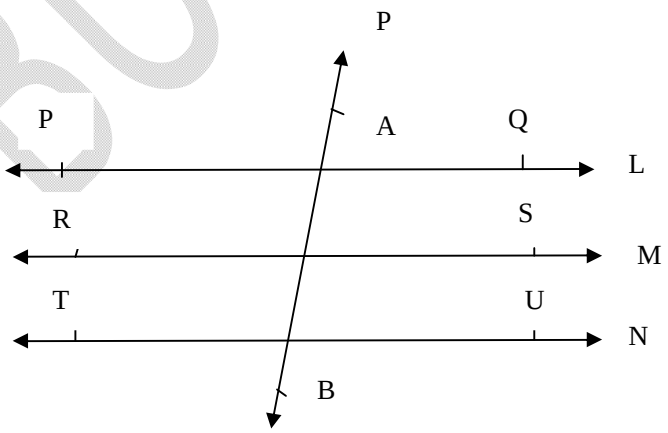
Q. 47) If two lines are parallel to the same line, then they are parallel to each other

solution:

antecedent: line l ∥ line m ∥ line n

consequent : line l ∥ line n

Diagram:



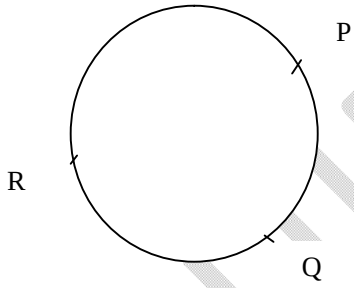
Q. 48) There is one and one circle passing through three given non-collinear points

solution:

antecedent: point P,Q.R are non-collinear

consequent: one and only one circle passes through three points

Diagram:

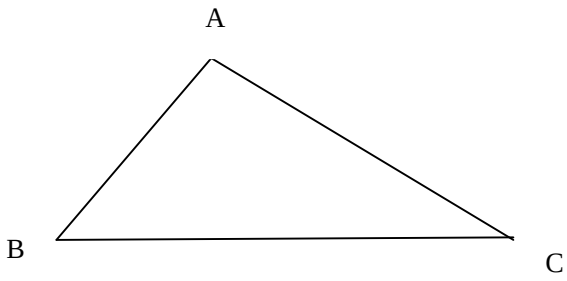


Q.49) If two angles of a triangle are not congruent then the side opposite to the greater angle is the longer side

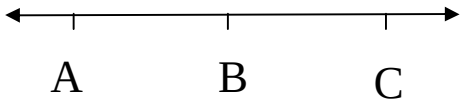
solution:

antecedent: In ΔABC , $\angle B > \angle C$

consequent: $AC > AB$



Q. 50) Point B is the midpoint of seg AC and d (A,C) = 13.5 cm then find the length of seg AB (3 marks)



point ☐ is the midpoint of seg AC

AB = BC = $\frac{1}{2}$ ☐

= $\frac{1}{2}$ ☐ ……..(AC = 13.5 cm)

= $\frac{\quad}{2}$

= ☐ cm

solution: point B is the midpoint of seg AC

∴ AB = AC = $\frac{1}{2}$ **AC**

= $\frac{1}{2}$ **13.5** ……..(AC = 13. 5 cm)

= $\frac{13.5}{2}$

= **6.75** cm