

**Class.6.Maths By: Prashant Kumar**

**Understanding Elementary Shapes**

**(Solved Exercise)**

**Ex 5.1**

**Q1.What is the disadvantage in comparing line segment by mere observation?**

**Solution:**

Comparing the lengths of two line segments simply by 'observation' may not be accurate. So we use divider to compare the length of the given line segments.

**Q 2.Why is it better to use a divider than a ruler, while measuring the length of a line segment?**

**Solution:**

Measuring the length of a line segment using a ruler, we may have the following errors:

- (i) Thickness of the ruler
- (ii) Angular viewing

These errors can be eradicated by using the divider. So, it is better to use a divider than a ruler, while measuring the length of a line segment.

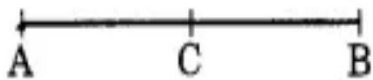
**Q.3**

Draw any line segment, say  $\overline{AB}$ . Take any point C lying in between A and B. Measure the lengths of AB, BC and AC. Is  $AB = AC + CB$ ?

[Note: If A, B, C are any three points on a line such  $AC + CB = AB$ , then we can be sure that C lies between A and B]

Solution:

Let us consider



A, B and C such that C lies between A and B  
and  $AB = 7$  cm.

$AC = 3$  cm,  $CB = 4$  cm.

$\therefore AC + CB = 3 \text{ cm} + 4 \text{ cm} = 7 \text{ cm}$ .

But,  $AB = 7$  cm.

So,  $AB = AC + CB$ .

**Q4.** If A, B, C are three points on a line such that  $AB = 5$  cm,  $BC = 3$  cm and  $AC = 8$  cm, which one of them lies between the other two?

**Solution:**

We have,  $AB = 5$  cm;  $BC = 3$  cm

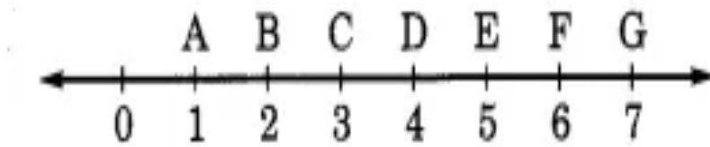
$\therefore AB + BC = 5 + 3 = 8$  cm

But,  $AC = 8$  cm

Hence, B lies between A and C.

**Q5.**

Verify, whether D is the mid point of  $\overline{AG}$  .



Solution:

From the given figure, we have

$$AG = 7 \text{ cm} - 1 \text{ cm} = 6 \text{ cm}$$

$$AD = 4 \text{ cm} - 1 \text{ cm} = 3 \text{ cm}$$

$$\text{and } DG = 7 \text{ cm} - 4 \text{ cm} = 3 \text{ cm}$$

$$\therefore AG = AD + DG.$$

Hence, D is the mid point of  $\overline{AG}$ .

**Q6.**

If B is the mid point of  $\overline{AC}$  and C is the mid point of  $\overline{BD}$ , where A, B, C, D lie on a straight line, say why  $AB = CD$ ?

Solution:

We have



B is the mid point of  $\overline{AC}$ .

$\therefore AB = BC \dots(i)$

C is the mid-point of  $\overline{BD}$ .

$BC = CD$

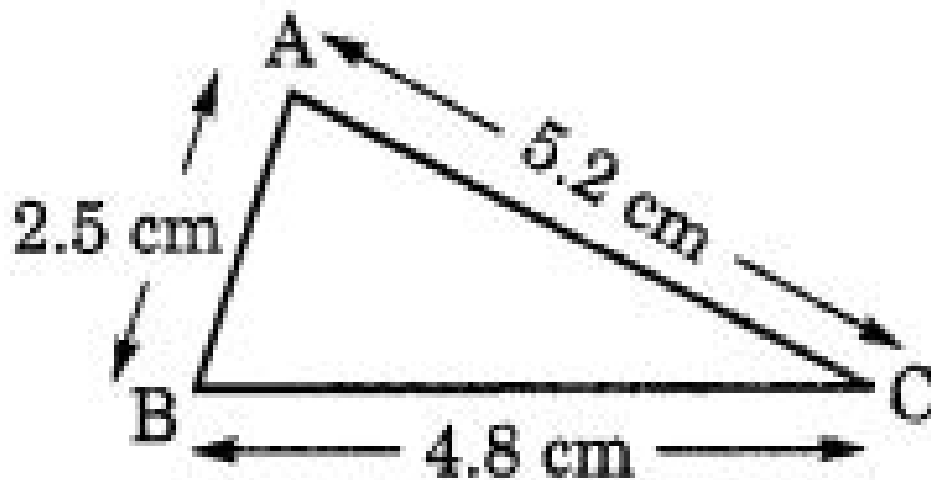
From Eq.(i) and (ii), We have

$AB = CD$

**Q 7. Draw five triangles and measure their sides. Check in each case, if the sum of the length of any two sides is always less than the third side.**

**Solution:**

Case I. In  $\triangle ABC$



Let  $AB = 2.5 \text{ cm}$

$BC = 4.8 \text{ cm}$

and  $AC = 5.2 \text{ cm}$

$AB + BC = 2.5 \text{ cm} + 4.8 \text{ cm}$

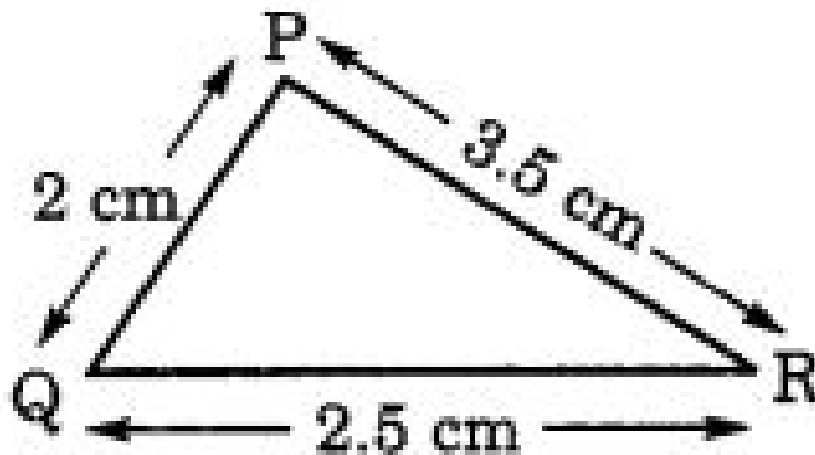
$= 7.3 \text{ cm}$

Since,  $7.3 > 5.2$

So,  $AB + BC > AC$

Hence, sum of any two sides of a triangle is greater than the third side.

Case II. In  $\triangle PQR$ ,



Let  $PQ = 2 \text{ cm}$

$QR = 2.5 \text{ cm}$

and  $PR = 3.5 \text{ cm}$

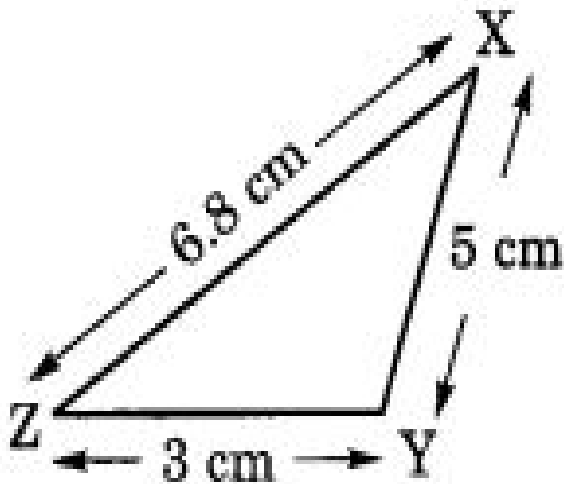
$PQ + QR = 2 \text{ cm} + 2.5 \text{ cm} = 4.5 \text{ cm}$

Since,  $4.5 > 3.5$

So,  $PQ + QR > PR$

Hence, sum of any two sides of a triangle is greater than the third side.

Case III. In  $\triangle XYZ$ ,



Let  $XY = 5$  cm

$YZ = 3$  cm

and  $ZX = 6.8$  cm

$XY + YZ = 5$  cm +  $3$  cm

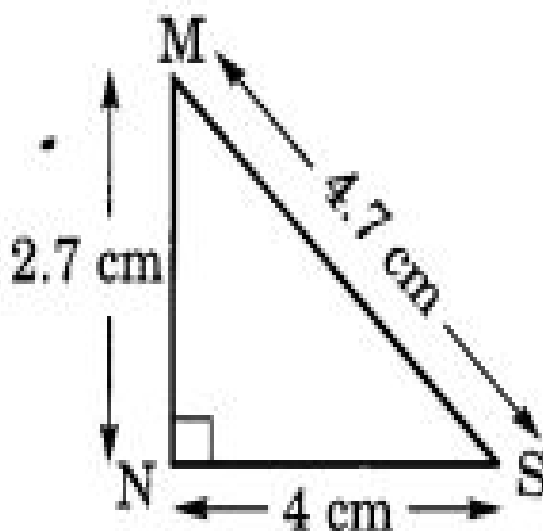
$= 8$  cm

Since,  $8 > 6.8$

So,  $XY + YZ > ZX$

Hence, the sum of any two sides of a triangle is greater than the third side.

Case IV. In  $\triangle MNS$ ,



Let  $MN = 2.7$  cm

$NS = 4$  cm

$$MS = 4.7 \text{ cm}$$

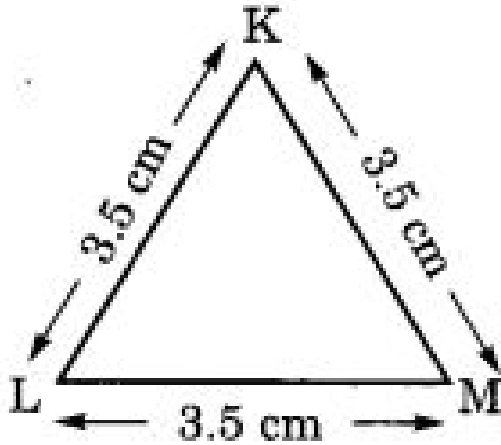
$$\text{and } MN + NS = 2.7 \text{ cm} + 4 \text{ cm} = 6.7 \text{ cm}$$

Since,  $6.7 > 4.7$

So,  $MN + NS > MS$

Hence, the sum of any two sides of a triangle is greater than the third side.

Case V. In  $\triangle KLM$ ,



$$\text{Let } KL = 3.5 \text{ cm}$$

$$LM = 3.5 \text{ cm}$$

$$KM = 3.5 \text{ cm}$$

$$\text{and } KL + LM = 3.5 \text{ cm} + 3.5 \text{ cm} = 7 \text{ cm}$$

$$7 \text{ cm} > 3.5 \text{ cm}$$

So,  $KL + LM > KM$

Hence, the sum of any two sides of a triangle is greater than the third side.

Hence, we conclude that the sum of any two sides of a triangle is never less than the third side.

#### Ex-5.2

**Q1. What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from**

- (a) 3 to 9
- (b) 4 to 7
- (c) 7 to 10
- (d) 12 to 9
- (e) 1 to 10
- (f) 6 to 3

**Solution:**

(a) 3 to 9

$$9 - 3 = 6 \div 12 = \frac{1}{2} \text{ of a revolution}$$

(b) 4 to 7

$$7 - 4 = 3 \div 12 = \frac{1}{4} \text{ of a revolution}$$

(c) 7 to 10

$$10 - 7 = 3 \div 12 = \frac{1}{4} \text{ of a revolution}$$

(d) 12 to 9 i.e., 0 to 9

$$9 - 0 = 9 \div 12 = \frac{3}{4} \text{ of a revolution}$$

(e) 1 to 10

$$10 - 1 = 9 \div 12 = \frac{3}{4} \text{ of a revolution}$$

(f) 6 to 3 i.e., 6 to 12 and then 12 to 3

$$6 \text{ to } 12 = 12 - 6 = 6 \text{ and } 12 \text{ to } 3 = 0 \text{ to } 3 = 3 -$$

$$0 = 3$$

$$6 + 3 = 9 \div 12 = \frac{3}{4} \text{ of a revolution}$$

**Q 2. Where will the hand of a clock stop if it**

**(a) starts at 12 and makes  $\frac{1}{2}$  of a revolution, clockwise?**

**(b) starts at 2 and makes  $\frac{1}{2}$  of a revolution, clockwise?**

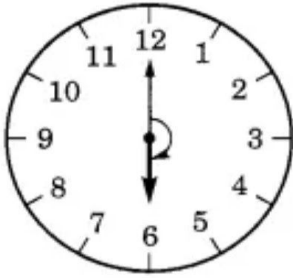
**(c) starts at 5 and makes  $\frac{1}{4}$  of a revolution, clockwise?**

**(d) starts at 5 and makes  $\frac{3}{4}$  of a revolution, clockwise?**

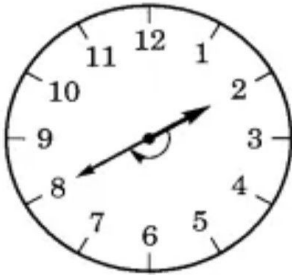
**Solution:**



(a) Starting from 12 and making  $\frac{1}{2}$  of a revolution, the clock hand stops at 6.



(b) Starting from 2 and making  $\frac{1}{2}$  of a revolution, the clock hand stops at 8.



(c) Starting from 5 and making  $\frac{1}{4}$  of a revolution, the clock hand stops at 8.



(d) Starting from 5 and making  $\frac{3}{4}$  of a revolution, the clock hand stops at 2.



**Q3. Which direction will you face if you start facing**

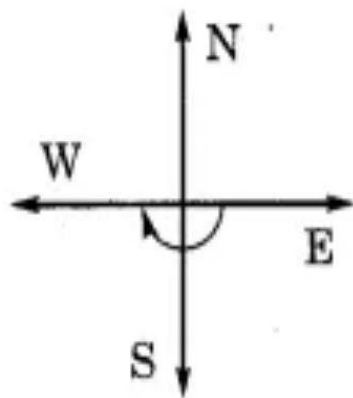
**(a) east and make  $\frac{1}{2}$  of a revolution clockwise? z**

**(b) east and make  $1\frac{1}{2}$  of a revolution clockwise? z**

**(c) west and make  $\frac{3}{4}$  of a revolution anticlockwise?**

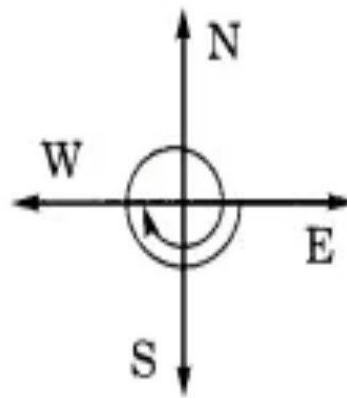
**(d) south and make one full revolution? (Should we specify clockwise or anticlockwise for this last question? Why not?)**

**Solution:**



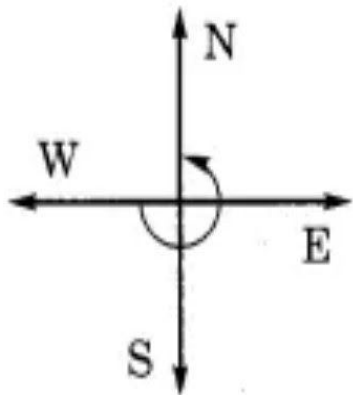
West

(a)



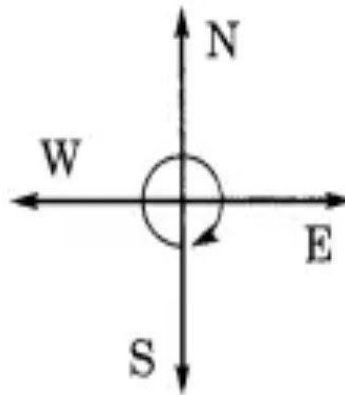
West

(b)



North

(c)



South

(d)

Taking one full revolution we will reach back to the original (starting) position. Therefore, it make no difference whether we turn clockwise or anticlockwise.

**Q4. What part of a revolution have you turned through if you stand facing**

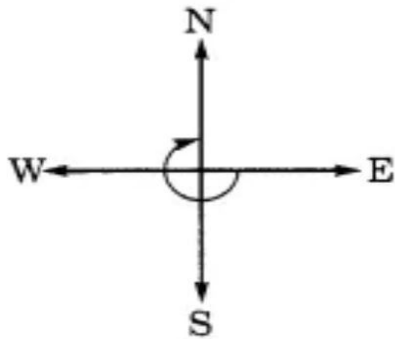
**(a) east and turn clockwise to face north?**

**(b) south and turn clockwise to face east?**

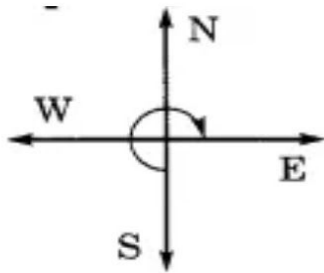
**(c) west and turn clockwise to face east?**

**Solution:**

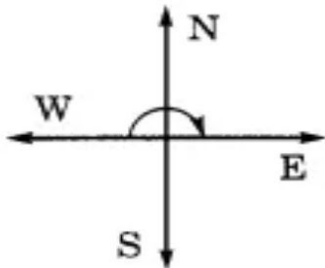
(a) If we start from east and reach at north (turning clockwise)  $\frac{3}{4}$  of a revolution is required.



(b) If we start from south turning clockwise to face east,  $\frac{3}{4}$  of a revolution is required.



(c) If we start from west turning clockwise to face east,  $\frac{1}{2}$  of a revolution is required.



**Q 5. Find the number of right angles turned through by the hour hand of a clock when it goes from**

**(a) 3 to 6**

**(b) 2 to 8**

**(c) 5 to 11**

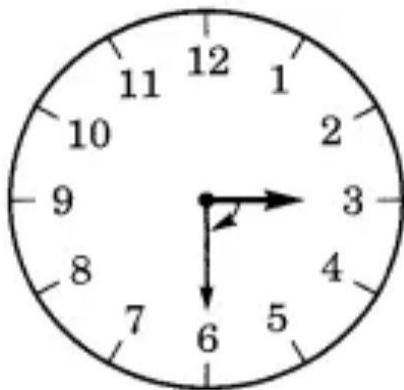
**(d) 10 to 1**

**(e) 12 to 9**

**(f) 12 to 6**

**Solution:**

(a) 3 to 6



Starting from 3 to 6, the hour hand turns through 1 right angle.

(b) 2 to 8



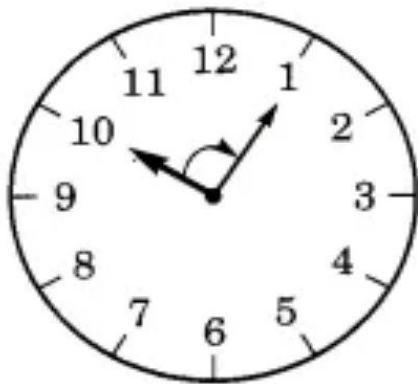
Starting from 2 to 8, the hour hand turns through 2 right angles.

(c) 5 to 11



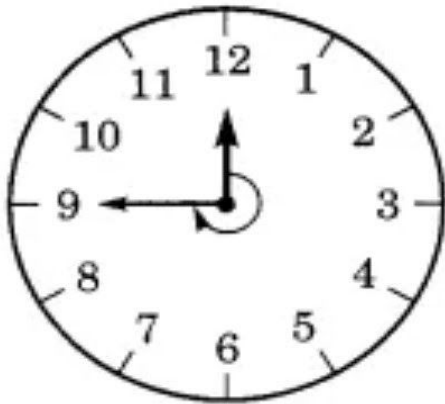
Starting from 5 to 11, the hour hand turns through 2 right angles.

(d) 10 to 1



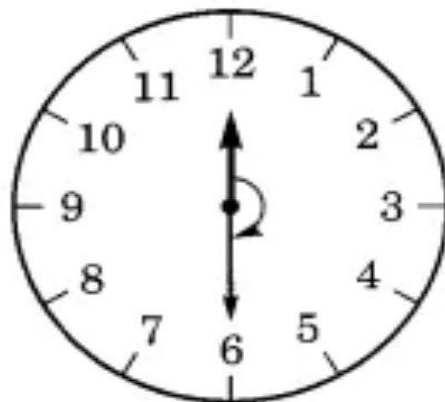
Starting from 10 to 1, the hour hand turns through 1 right angle.

(e) 12 to 9



Starting from 12 to 9, the hour hand turns through 3 right angles.

(f) 12 to 6



Starting from 12 to 6, the hour hand turns through 2 right angles.

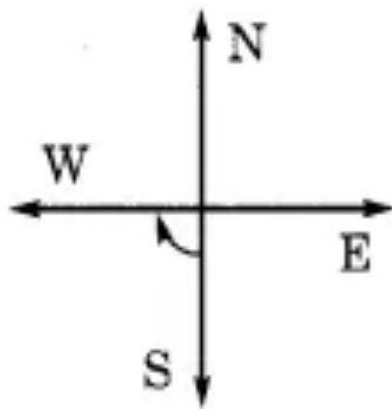
**Q6.**How many right angles do you make if you start facing

- (a) south and turn clockwise to west?
- (b) north and turn anticlockwise to east?
- (c) west and turn to west?



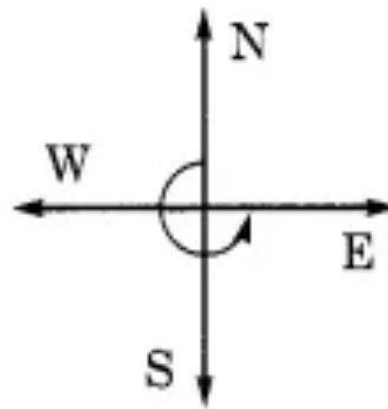
(d) south and turn to north?

Solution:



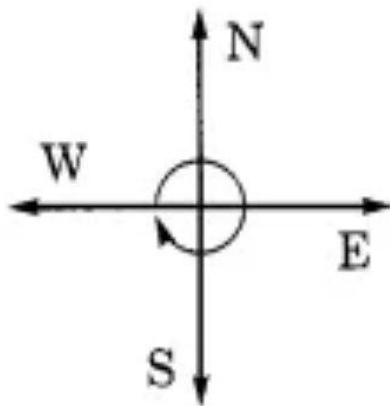
(a)

(1 Right angle)



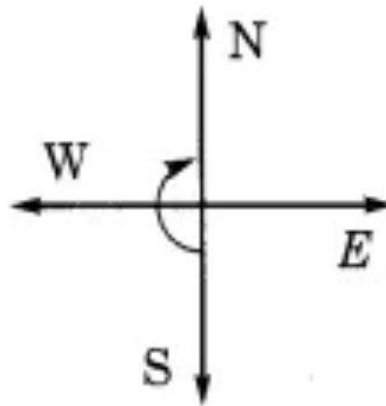
(b)

(3 Right angles)



(c)

(4 Right angles)



(d)

(2 Right angles)

**Q7.**Where will the hour hand of a clock stop if it starts

(a) from 6 and turns through 1 right angle?

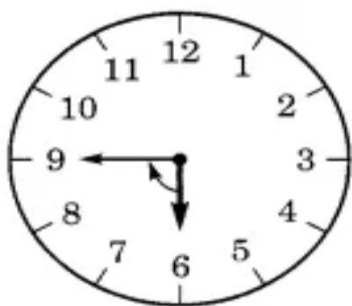
(b) from 8 and turns through 2 right angles?

(c) from 10 and turns through 3 right angles?

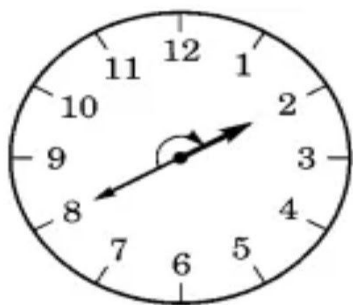
(d) from 7 and turns through 2 straight angles?

Solution:

(a) Starting from 6 and turning through 1 right angle, the hour hand stops at 9.



(b) Starting from 8 and turning through 2 right angles, the hour hand stops at 2.



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(c) Starting from 10 and turning through 3 right angles, the hour hand stops at 7.



(d) Starting from 7 and turning through 2 right angles, the hour hand stops at 7.

