

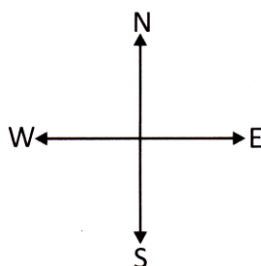
# Direction Test

## Learning Objectives

- Understanding the Concept of Directions
- Important Points Regarding Directions
- Concept of Minimum Distance

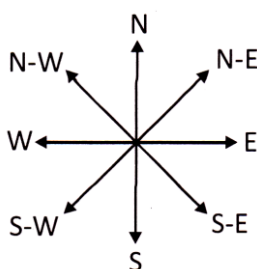
## Understanding the Concept of Directions

There are four main directions – East, West, North and South as shown below:



**Note:** On paper North is always on the top while South is always as the bottom.

There are four cardinal directions – North-East (N - E), North-West (N - W), South-East (S - E) and South-West (S - W) as shown below.



## Important Points Regarding Directions

- If our face is towards North, then after left turn our face will be towards West while after right turn it will be towards East.
- If our face is towards South, then after left turn our face will be towards East and after right turn it will be towards West.
- If our face is towards East, then after left turn our face will be towards North and after right turn it will be towards South.
- If our face is towards West, then after left turn our face will be towards South and after right turn it will be towards North.
- If our face is towards North-West, then after left turn our face will be towards South-West and after right turn it will be towards North-East.
- If our face is towards South-West, then after left turn our face will be towards South-East and after right turn it will be towards North-West.
- If our face is towards South-East, then after left turn our face will be towards North-East and after right turn it will be towards South-West.
- If our face is towards North-East, then after left turn our face will be towards North-West and after right turn it will be towards South-East.

## Important Points Regarding Shadow of a Person

- At the time of sunrise if a man stands facing the East, his shadow will be towards West.
- At the time of sunset the shadow of an object is always in the East.
- If a man stands facing the North, at the time of sunrise his shadow will be towards his left and at the time of sunset it will be towards his right.
- At 12:00 noon, the rays of the sun are vertically downward hence there will be no shadow.

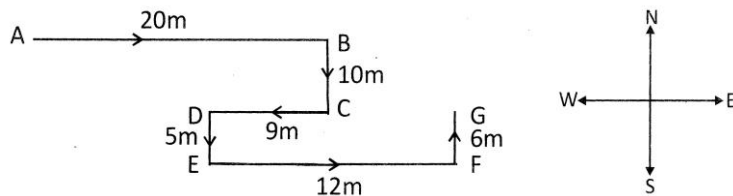
### Example

**A cat runs 20 metre towards East and turns right, runs 10 metre and turns to right, runs 9 metre and again turns to left, runs 5 metre and then turns to left, runs 12 metre and finally turns to left and runs 6 metre. Now in which direction the cat is facing?**

- (a) East (b) North  
(c) West (d) South  
(e) None of these

**Ans.** (b)

**Explanation:** The movement of cat can be shown by the following diagram.



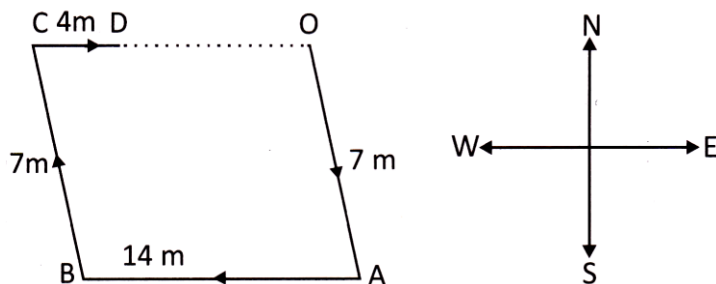
From the above diagram, it is clear that the cat is facing North.

**Meena moves a distance of 7 m towards South-East, then she moves towards West and travels a distance of 14 m. From here, she moves a distance of 7 m toward North-West and finally she moves a distance of 4 m towards East and stood at that point. How far is the starting point from where she stood?**

- (a) 3 m (b) 4 m  
(c) 5 m (d) 10 m  
(e) None of these

**Ans.** (d)

**Explanation:** The movements of Meena are as shown in figure.



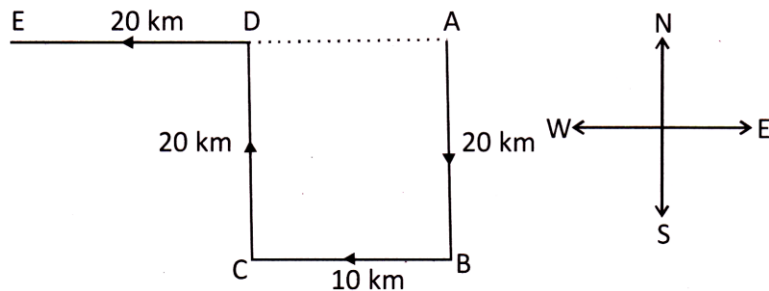
Clearly, Meena's distance from the starting point O is OD  
 $= (OC - CD) = (AB - CD) = (14 - 4) \text{ m} = 10 \text{ m}.$

## Commonly Asked Questions

**One day Neeraj left home and cycled 20 km southwards, turned right and cycled 10 km then turned right and cycled 20 km and finally turned left and cycled 20 km. How many kilometres will he have to cycle to reach his home straight?**

- (a) 50 km  
(b) 30 km  
(c) 40 km  
(d) 60 km  
(e) None of these

Ans. (b)



**Explanation:**

Neeraj starts from home at A, moves 20 km to South upto B. Then he turns right and moves 10 km upto C, then he turns right and moves 20 km upto D, then he turns left and moves 20 km upto E.

So, from image it is clear that, if he moves straight, then he will have to move AD + DE to reach the home.

Now,  $AD = BC = 10$  km.

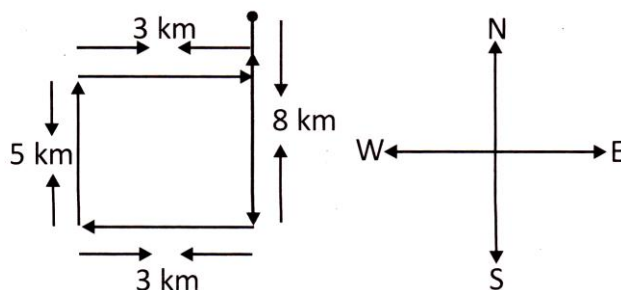
Thus,  $AD + DE = 10 + 20 = 30$  km

So, he will have to move 30 km to reach the home.

**Deepak went 8 km towards South and then turned to his right and walked 3 km. From this point, he again turned to his right and walked 5 km. In the end he turned to his right again and walked 3 km and then turned to his left and stopped. In which direction is Deepak from the starting point?**

- (a) East  
(b) North  
(c) West  
(d) South  
(e) None of these

**Explanation:** The movements of Deepak are shown in the diagram given below:



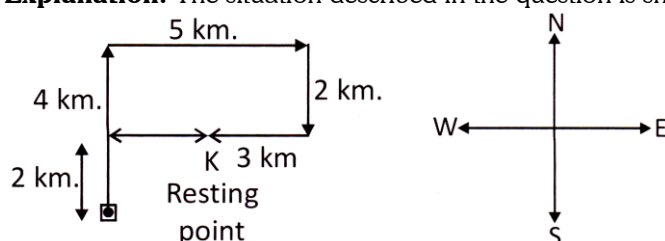
It is clear from the diagram that Deepak came back on the path (from where he started his journey) and facing the same point from where he started his journey. Thus, Deepak is facing towards South direction at the end.

**A walks 4 km North and turns right and walks 5 km. Then he turns towards South and walks 2 km. Again he turns towards West and walks 3 km and rests. Again he walks 2 km. How far is A now from his initial point?**

- (a) 16 km  
(b) 12 km  
(c) 2 km  
(d) 4 km  
(e) None of these

Ans. (c)

**Explanation:** The situation described in the question is shown in the diagram given below.



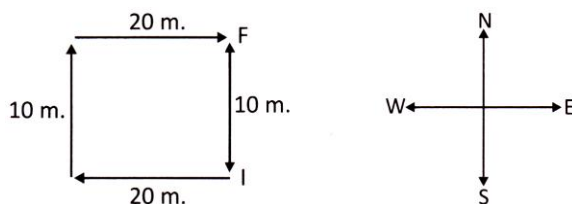
Thus, the diagram clearly shows that A is at a distance of 2 km from his initial point.

**Kanika walked 20 metres towards West. Then turning right, she walked 10 metres Again she turned right and moved 20 metres. In which direction and how far is she from her original position?**

- (a) North, 50 m                      (b) North, 10 m  
(c) East, 50 m                      (d) South, 10 m  
(e) None of these

**Ans.** (b)

**Explanation:** Let I be the starting point and F be the final point. The path followed by Kanika during her movement is shown below:



So, Kanika is 10 m away from her original position in North direction

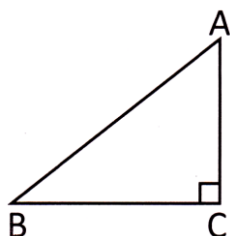
## Concept of Minimum Distance

When a person moves in a straight line from a point A (say) to another point C and then turns to his right or left and again moves in a straight path upto B, he covers a distance of  $AC + CB$  to reach at point B from the point A.

In this case points A, B and C join to form a right angle triangle. Here, the sides AC and BC are called perpendicular and base respectively and the sides AB is called hypotenuse. AC, BC and AB are related by the following formula

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

This importance rule is known as '**Pythagoras Theorem**'. The distance AB gives the minimum distance between points A and B.



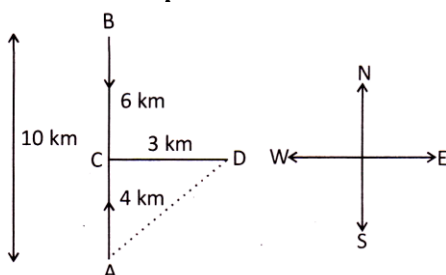
### Example

**Prakash walks 10 km towards North. From there he walks 6 km towards South. Then, he walks 3 km towards East. How far and in which direction is he with reference to his starting point?**

- (a) 5 km North                      (b) 5 km South  
(c) 5 km East                      (d) 5 km North-East  
(e) None of these

**Ans.** (d)

Prakash moves 10 km northwards from A upto B, then moves 6 km southwards upto C, turns towards East and moves 3 km upto D as shown below:



Then  $AC = (AB - BC) = 4 \text{ km}$

So, Prakash's distance from starting point A =  $AD = \sqrt{AC^2 + CD^2} = \sqrt{4^2 + 3^2} = 5$

So, Prakash is 5 km far from the starting point in North-East direction with reference to starting point.

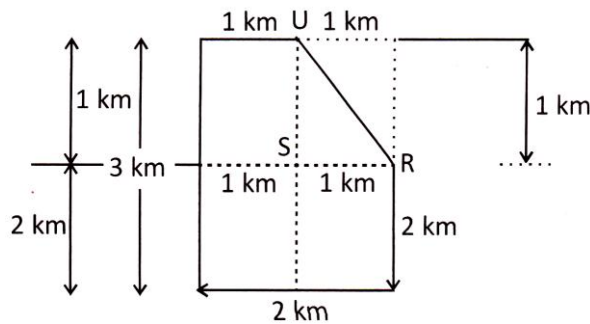
## Commonly Asked Questions

**Preeti forgot the way while going to her uncle's house. She went 2 km South, then turned right and went 2 km West. She then turned right and walked 3 km, and again turned right and walked 1 km to reach her uncle's house. How far is her uncle's house from Preeti's house?**

- (a) 1 km
- (b) 7 km
- (c) 2 km
- (d)  $\sqrt{2}$  km
- (e) None of these

**Ans.** (d)

Let R be the Preeti's house and U represents the uncle's house. The path travelled by Preeti is shown below:



According to Pythagoras theorem,  $RU^2 = \sqrt{RS^2 + SU^2} = \sqrt{1^2 + 1^2} = \sqrt{2} \text{ km}$