

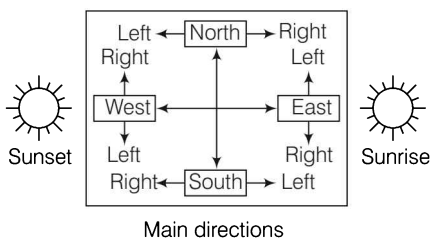


# Direction Sense Test

- Direction is the measurement of position of one thing with respect to another thing and displacement is the measurement of distance between the starting point and final point.
- The problems based on direction sense test have instructions regarding the movement of a person or an object from a starting point (also called origin) upto an end point (also called destination).
- These instructions generally provide magnitude as well as direction of the movement. These questions are designed to test the candidate's ability to sense direction.

## Main Directions

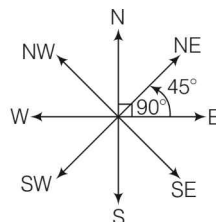
- There are four main directions viz. East, West, North and South as shown in the figure given below.



- Abbreviations for these directions are E (East), W (West), N (North) and S (South).

## Cardinal Directions

- A direction between two adjacent main directions is called cardinal direction or subdirection, i.e. NE (North-East), NW (North-West), SE (South-East) and SW (South-West)
- Students are advised to use diagram as given below for the purpose of sensing directions.



- Angle formed between two main directions (i.e. North and East, North and West, South and East or South and West) is  $90^\circ$  and angle formed between a cardinal direction and a main direction is  $45^\circ$ .

## Shortest Distance

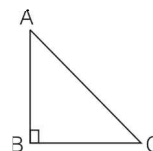
- For finding shortest distance between two points, it is necessary to know Pythagoras theorem. Here, in  $\triangle ABC$ ,

AB = Perpendicular

BC = Base and AC = Hypotenuse

Hence, for shortest distance between A and C

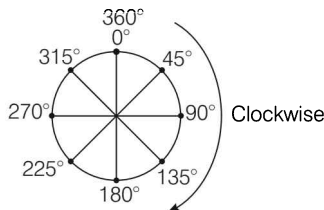
i.e.  $AC = \sqrt{AB^2 + BC^2}$



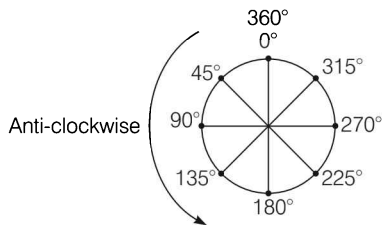
## Angle of Movement

- For solving questions based on angle of movement, it is necessary to know the rotations which are given below

Movement towards the right is called the clockwise (CW) movement.

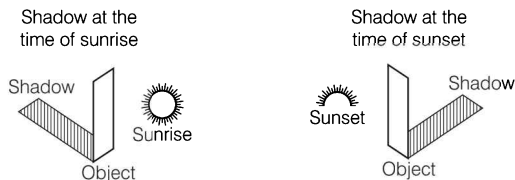


Movement towards the left is called anti-clockwise (ACW) movement.



## Concept of shadow

- In the morning, when the Sun rises in the East, the shadow of any person or object falls in the West direction. Similarly, in the evening, when the sun sets in the West, the shadow of a person or an object is towards the East.

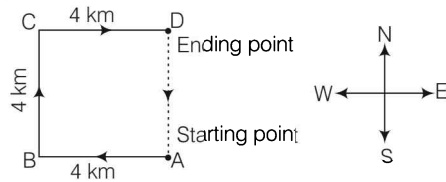


At 12:00 noon, there will be no shadow as the rays of the Sun are vertically downwards at that time.

**Example 1** After starting from a point, a man walks 4 km towards West, then turning to his right he moves 4 km. After this, he again turns right and moves 4 km. Which choice given below indicates the correct direction in which he is from his starting point ?

- (a) North (b) East  
(c) South (d) West

**Sol. (a)** The direction diagram of a man is as given below

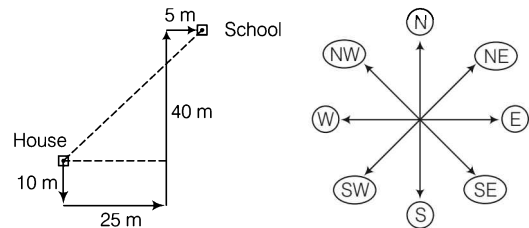


Let A be the starting point and D be the ending point of man. It is clear from the diagram that, he is in North direction from his starting point.

**Example 2** Ram walks 10 m South from his house, turns left and walks 25 m, again turns left and walks 40 m, then turns right and walks 5 m to reach the school. In which direction is the school from his house?

- (a) North (b) South-West  
(c) North-East (d) East

**Sol. (c)** According to the question, we have the following direction diagram.

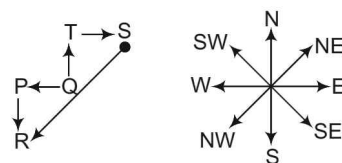


So, it is clear from the diagram that school is in North-East direction from Ram's house.

**Example 3** Five villages P, Q, R, S and T situated close to each other. P is to the West of Q, R is to the South of P, T is to the North of Q and S is to the East of T. Then, in which direction R is with respect to S?

- (a) North-West (b) South East  
(c) South-West (d) Data inadequate

**Sol. (c)** According to the given information, locations of the five villages can be represented as show below

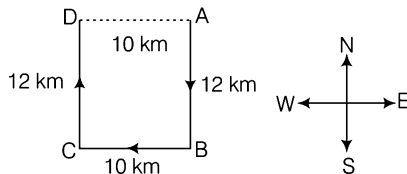


Clearly, R lies to the South-West of S.

**Example 4** Vijay travelled 12 km Southward, then turned right and travelled 10 km, then turned right and travelled 12 km. How far was Vijay from the starting point ?

- (a) 22 km (b) 44 km  
(c) 12 km (d) 10 km

**Sol.** (d) Direction diagram of Vijay is as follows



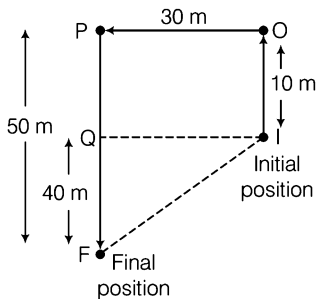
Point A is the starting point and D is the final point.

Now, Vijay's distance from starting point  
= AD = BC = 10 km

**Example 5** Kavi walks Northward upto 10 m. He turns left and walks 30 m. Finally, he turns left and walks 50 m. At what distance Kavi is now from his starting position?

- (a) 50 m (b) 10 m (c) 20 m (d) 90 m

**Sol.** (a) According to the question, the direction diagram is drawn as shown in adjacent figure.



$$IO = 10\text{m}, OP = 30\text{m}, PF = 50\text{m}$$

$$QI = OP = 30\text{m}, PQ = IO = 10\text{m}$$

$$QF = PF - PQ = 50 - 10 = 40\text{m}$$

F represents the final position.

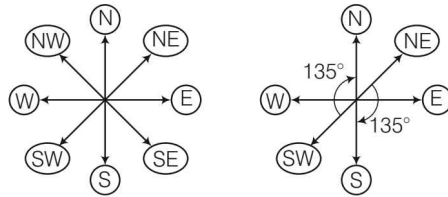
$$\therefore \text{Required distance, } IF = \sqrt{(QI)^2 + (QF)^2}$$

$$= \sqrt{(30)^2 + (40)^2} = \sqrt{900 + 1600} = \sqrt{2500} = 50\text{m}$$

**Example 6** If South-West becomes North, then what will North-East be?

- (a) North (b) South-East  
(c) South (d) East

**Sol.** (c) The diagrammatic representation of directions is as shown below

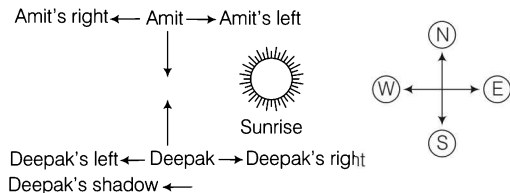


Clearly, directions are moving 135° clockwise. Hence, North-East will become on South on moving 135° clockwise.

**Example 7** At sunrise, Amit and Deepak are having a conversation standing in front of each other. The shadow of Deepak is formed towards the right hand of Amit. What direction is Deepak facing?

- (a) North-East (b) South  
(c) East (d) North

**Sol.** (d) According to the question, the direction diagram is drawn as



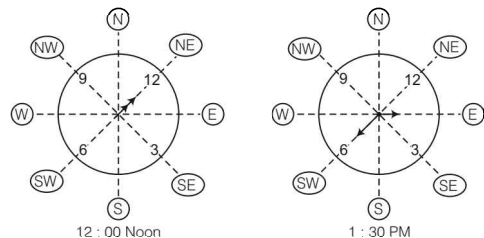
Clearly, Deepak is facing North.

**Example 8** A clock is so placed that at 12 noon its minute hand points towards North-East. In which direction does its hour hand point at 1 : 30 pm?

- (a) North (b) South (c) East (d) West

**Sol.** (c) In this question, the clock is placed so that at 12 noon its minute hand points towards North-East.

We know that, minute and hour hand point in the same direction at 12 noon. Therefore, the clock will look some what like this.



At 1:30 pm, the hour hand will point in the East direction.

# Practice Exercise

1. Rashmi goes towards East from a point P and then turns left. She walks some distance and then turns to her right. Which direction is she facing now?  
(a) North (b) East (c) West (d) South
2. Vipul goes Northward 10m. He turns left and walks 30 m, then he again turns left and walks 50 m, then how much distance Vipul travelled?  
(a) 60 m (b) 20 m  
(c) 10 m (d) 90 m
3. A person walks 1 mile to West, turns left and walks 1 mile and again turns left and walks 1 mile. What is the direction he is facing now?  
(a) North (b) South  
(c) East (d) West
4. If Ram's house is located to the South of Krishna's house and Govinda's house is to the East of Krishna's house, in what direction is Ram's house situated with respect to Govinda's house?  
(a) North-East (b) North-West  
(c) South-East (d) South-West
5. Vinod starts from his house and travels 4 km in East direction, after that he turns towards left and moves 4 km. Finally, he turns towards left and moves 4 km. At what distance and in which direction he finally stands from his starting point?  
(a) North, 4 km (b) North-East, 4 km  
(c) South 12 ,m (d) West, 4 km
6. Raman starts from his house and goes towards 15 m North, then he turns his right and walks 30 m. Now, he turns his right and moves 30 m to reach a temple. In which direction is the temple with respect to Raman's house?  
(a) North-West (b) South  
(c) South-East (d) West
7. Shreya started from point P and walked 2 m towards West. She , then took a right turn and walked 3 m before taking a left turn and walking 5 m. She finally took a left turn, walked 3 m and stopped at a point Q. How far is point Q from point P?  
(a) 2 m (b) 6 m (c) 7 m (d) 8 m
8. Laxman went 15 km to the West from house, then turned left and walked 20 km. He, then turned East and walked 25 km and finally turning left covered 20 km. How far is he now from his house?  
(a) 15 km (b) 20 km  
(c) 25 km (d) 10 km
9. If East is replaced by South-East, then West will be replaced by which of the following directions?  
(a) North-East (b) North  
(c) East (d) North-West
10. One morning at 7 0' clock, Naresh started walking with his back towards the Sun. Then, he turned towards left, walked straight and then turned towards right and walked straight. Then, he again turned towards left. Now, in which direction is he facing?  
(a) North (b) East  
(c) West (d) South
11. The time in clock is quarter past twelve. If the hour hand points to the East, which is the direction opposite to the minute hand?  
(a) South-West (b) South  
(c) West (d) North
12. In an open ground, Rakesh walks 20 m towards North, turns left and goes 40 m. He turns to his left again to walk 50 m. How far is he from starting point?  
(a) 110 m (b) 70 m  
(c) 50 m (d) 40

- 13.** A direction pole was situated on the road crossing. Due to an accident, the pole turned in such a manner that the pointer which was showing East, started showing South. Sita, a traveller went to the wrong direction thinking it to be West. In what direction actually she was travelling?

(a) North (b) West  
(c) East (d) South

- 14.** One evening before sunset, two friends Raman and Arjun were talking to each

other face to face. If Raman's shadow was exactly to his left side, which direction was Arjun facing?

(a) West (b) East  
(c) North (d) South

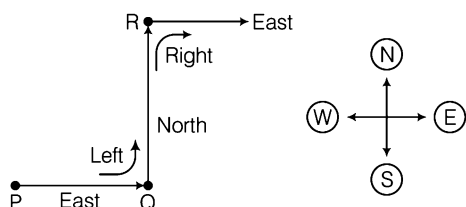
- 15.** A person moves 15 km in East direction, then turns towards North and moves 4 km. From here he turns towards West and travels 12 km. How far and in which direction is he from his starting point?  
(a) 31 km, South-West (b) 5 km, North-East  
(c) 19 km, North-East (d) 27 km, South-West

## Answers

1	(b)	2	(d)	3	(c)	4	(d)	5	(a)	6	(c)	7	(c)	8	(d)	9	(d)	10	(d)
11	(d)	12	(c)	13	(a)	14	(c)	15	(b)										

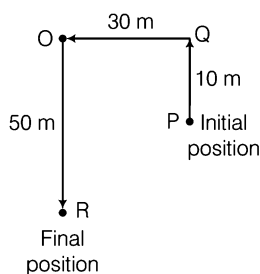
## Hints & Solutions

- 1.** (b) According to the question, the direction diagram is as follows



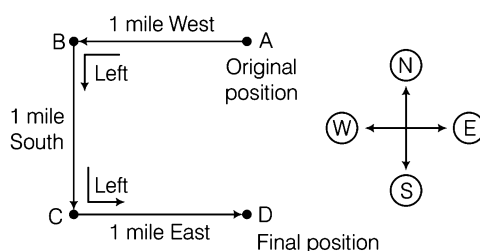
Clearly, Rashmi is facing East.

- 2.** (d) According to the question, the direction diagram is drawn as



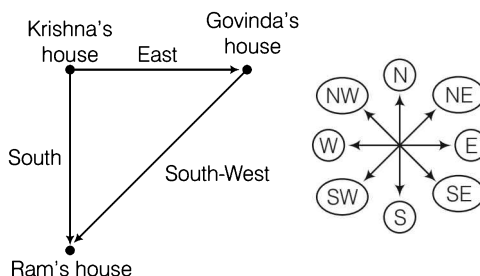
$$\begin{aligned}\text{Total distance} &= PQ + QO + OR \\ &= 10 + 30 + 50 \\ &= 90 \text{ m}\end{aligned}$$

- 3.** (c) According to the question, the direction diagram will be as follows



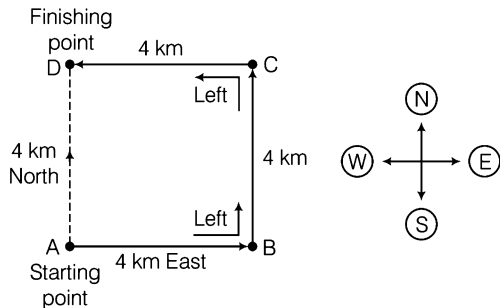
Clearly, person is facing East.

- 4.** (d) According to the question, the direction diagram will be as follows



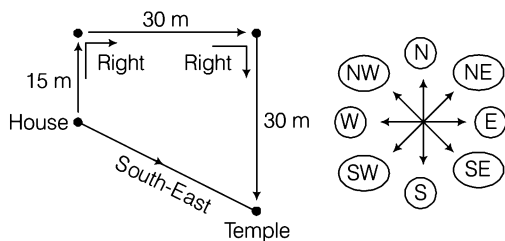
Clearly, Ram's house is to the South-West of Govinda's house.

5. (a) According to the question, the direction diagram is as follows



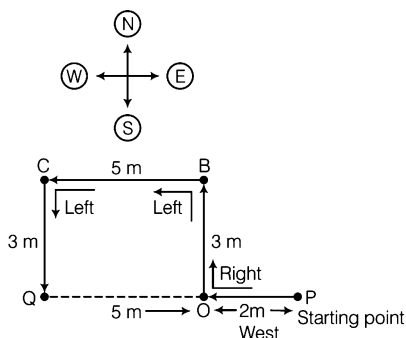
Clearly, at finishing point, he is 4 km North from the starting point.

6. (c) According to the question, the direction diagram is as follows



Clearly, temple is towards South-East with respect of Raman's house.

7. (c) According to the question, the direction diagram will be as follows



$$OP = 2 \text{ m}$$

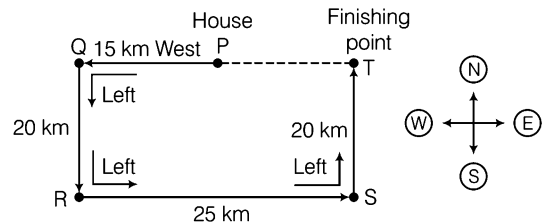
$$OB = QC = 3 \text{ m}$$

$$BC = QO = 5 \text{ m}$$

∴ Required distance,

$$QP = QO + OP = 5 + 2 = 7 \text{ m}$$

8. (d) According to the question, the direction diagram will be as follows



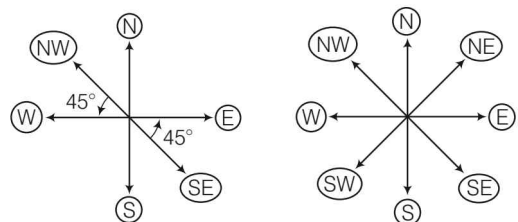
$$PQ = 15 \text{ km} \quad QR = TS = 20 \text{ km}$$

$$RS = 25 \text{ km}$$

∴ Required distance,

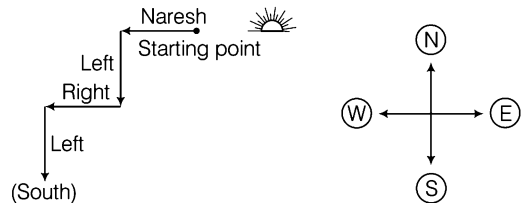
$$PT = QT - QP = RS - QP = 25 - 15 = 10 \text{ km}$$

9. (d) According to the question, the diagram will be as follows



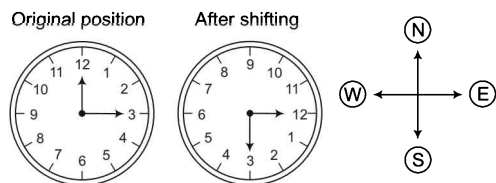
Clearly, West will be replaced by North-West.

10. (d) According to the question, the direction diagram will be as follows



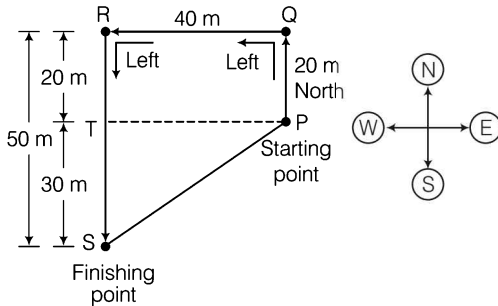
So, Naresh is facing towards South.

11. (d) Time quarter past twelve means that the time is 12:15.



Hence, when hour hand is pointing towards East, then the minute hand is pointing towards South. So, the direction opposite to minute hand is North.

12. (c) According to the question, the direction diagram is as follows

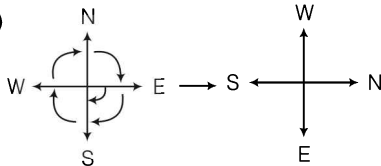


Here,  $PQ = RT = 20\text{m}$ ,  $QR = TP = 40\text{m}$   
and  $RS = 50\text{m}$

Now,  $TS = RS - RT = 50 - 20 = 30\text{m}$

$$\begin{aligned}\therefore \text{ Required distance, } PS &= \sqrt{(TP)^2 + (TS)^2} \\ &= \sqrt{(40)^2 + (30)^2} \\ &= \sqrt{1600 + 900} \\ &= \sqrt{2500} = 50\text{ m}\end{aligned}$$

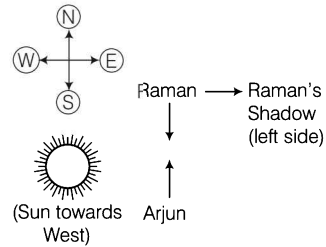
13. (a)



The, pointer which was showing West started showing South. Hence, the pointer turned  $90^\circ$  clockwise.

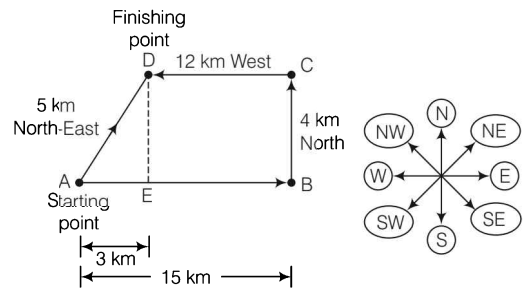
Now, Sita went to the direction thinking it as West, the original direction will be  $+90^\circ$  clockwise i.e. North direction.

14. (c) According to the question,



So, Arjun was facing North.

15. (b) According to the question, the direction diagram is as follows



$$AB = 15\text{ m}$$

$$BC = DE = 4\text{ km}$$

$$CD = EB = 12\text{ km}$$

$$AE = AB - EB = 15 - 12 = 3\text{ km}$$

$$\begin{aligned}\therefore \text{ Required distance, } AD &= \sqrt{(DE)^2 + (AE)^2} \\ &= \sqrt{4^2 + 3^2} \\ &= \sqrt{16 + 9} = 5\text{ km}\end{aligned}$$

Hence, D is 5 km far in North-East direction from the starting point A.