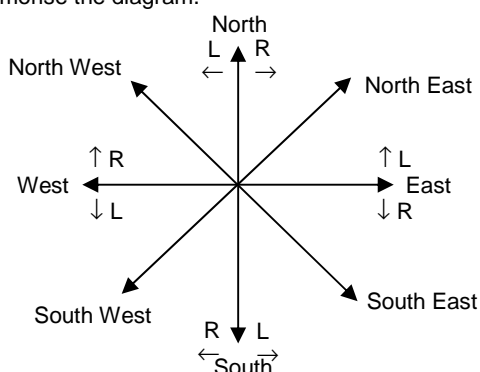


CHAPTER – 4

DIRECTION SENSE

The questions on direction sense typically involve a person moving certain distances in specified directions. Then, the student is asked to find out the distance between the initial and the final points. The easiest way of solving these problems is to draw a diagram as you read the information given in the problem and ensure that the diagram reflects all the information given in the problem.

To solve these types of problems, the student should be aware of the directions. The student should also recognize the left and right of a person walking in a particular direction. The following diagram shows all the directions and left (L) and right (R) of a person walking in that direction and the student should memorise the diagram.



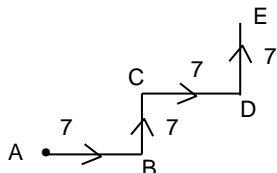
NOTE: The distance from a particular point after travelling a distance of x metres in the horizontal direction and a distance of y metres in the vertical direction is equal to $\sqrt{x^2 + y^2}$ (Please note that in common usage, North and South directions are referred as "vertical" directions and the East and West directions are referred as the "horizontal" directions).

Worked Out Examples:

Directions for questions 4.01 to 4.05: Select the correct alternative from the given choices.

- 4.01.** A person travels a distance of 7 km towards East from his house, then travels 7 km towards North and then a distance of 7 km towards East and finally 7 km towards North. What is the vertical distance traveled by him?

Sol.

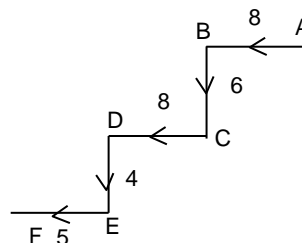


Let A and E be the initial and the final positions. The vertical distance travelled = $BC + ED = (7 + 7) \text{ km} = 14 \text{ km}$.

- 4.02.** A person starts from his house and travels 8 m towards West; then he travels 6 m towards his left, then 8 m towards West and then

4 m towards South. Finally, he turns right and travels 5 m. What is the horizontal distance traveled by him?

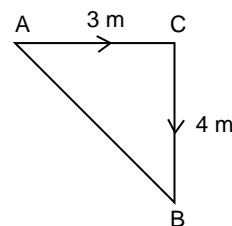
Sol.



Let A and F be the initial and the final positions. \therefore Horizontal distance traveled = $FE + DC + BA = 5 + 8 + 8 = 21 \text{ m}$.

- 4.03.** Surya travels 3 m towards East and then turns right and travels 4 m. What is the distance between the initial and the final positions of Surya?

Sol.

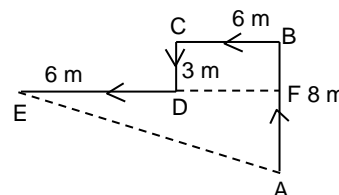


Let A and B be the initial and the final positions of Surya.

$$AB = \sqrt{AC^2 + BC^2} = \sqrt{3^2 + 4^2} = 5 \text{ m}.$$

- 4.04.** Starting from his house, Sachin walks a distance of 8 m towards North, then he turns left and walks 6 m, then walks 3 m towards South and finally travels 6 m towards West to reach his office. What is the distance between his house and office and also find in which direction is his office situated with respect to his house.

Sol.



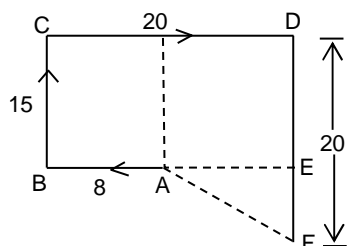
Let A be the Sachin's house and E his office. The distance between A and E

$$\begin{aligned} &= \sqrt{(EF)^2 + (AF)^2} \\ &= \sqrt{(ED + CB)^2 + (AB - FB)^2} \\ &= \sqrt{(ED + CB)^2 + (AB - CD)^2} \\ &= \sqrt{12^2 + 5^2} = 13 \text{ m}. \end{aligned}$$

His office is towards North-west of his house.

- 4.05. Starting from her house, Nisha traveled 8 m towards West, then turned right and travelled 15 m. She then traveled 20 m towards East, followed by 20 m to South to reach a hostel. How far is her house from the hostel and in which direction?

Sol.



Let A and F be the initial and final positions.

$$\text{Now } AF = \sqrt{AE^2 + EF^2}$$

$$AE = CD - BA$$

$$= 20 - 8 = 12 \text{ m}$$

$$EF = DF - DE$$

$$= DF - CB = 20 - 15 = 5 \text{ m}$$

$$\therefore AF = \sqrt{144 + 25} = \sqrt{169} = 13 \text{ m}$$

Her house is towards North-west from the hostel.

Exercise – 4

Directions for questions 1 to 19: Select the correct alternative from the given choices.

- Shiva travels 10 m towards West. He turns left and travels 15 m. Again he turns to his left and walks 10 m further. Finally, he walks 13 m towards North and then stops. At what vertical distance is he from his house?
(A) 13 m (B) 15 m (C) 28 m (D) 2 m
- Kuber travels a distance of 7 km South, then travels 6 km East, and finally travels 15 km towards his left side. What is the distance between the final and the initial point in the journey?
(A) 14 km (B) 11 km (C) 10 km (D) 15 km
- A person starts walking from his house to the nearby park. He travels 5 m to the East, then travels 10 m to the left and then travels 8 m to the right. He further travels 2 m North and finally travels 3 m East to reach the park. How far is the park from his house?
(A) 20 m (B) 40 m (C) 28 m (D) 25 m
- Shahana walks towards South for 15 km and then turns towards East to travel 10 km further. She then travels a distance of 6 km towards her right side and again 12 km towards the right side. Finally, she travels 17 km towards North. Find the horizontal distance travelled by her in the journey. Also, find the direction she is facing at the end of the journey?
(A) 12 km, South (B) 2 km, North
(C) 24 km, North (D) 12 km, South
- Samir walks 8 km towards North. Then he turns right and walks a further 8 km. How far and in what direction is he from the starting point?
(A) 10 km towards North
(B) 11 km towards North-east
(C) 16 km towards North-east
(D) None of these
- Maninder travels 5 km towards East and then travels 7 km South. He turns right to travel 11 km further. Now, he travels 5 km South and finally 4 km towards the left. How far is he approximately from his original position and in which direction?
(A) 11 km towards North
(B) 12 km towards South-west
(C) 12 km towards North-east
(D) 11 km towards South
- Salil travels 9 km towards East, then 8 km towards North, and finally travels 7 km towards East. How far is he from his original place and in which direction (approximately)?
(A) 15 km, North-east (B) 18 km, South-west
(C) 15 km, South-west (D) 18 km, North-east
- After walking 7 m straight I took a turn towards the left and jogged for 15 m. After this I turned left and walked for 7 m, then turned right and jogged a few metres more. Now I am moving towards East. Towards which direction did I start my journey?
(A) East (B) West
(C) North (D) South
- Two motorists start from opposite points on a main road. The distance between the two points is 250 km. One motorist travels for 50 km on the road and he could not ride further as his vehicle developed a snag. The other motorist travelled for 65 km on the main road, then took a left turn to travel 30 km. He now turned right and drove for 45 km. Finally, he turned to reach the main road and stopped when he touched the main road. Find the distance between the two motorists now.
(A) 190 km (B) 200 km
(C) 160 km (D) 90 km
- Rohit started from his house and walked for 15 m towards the East where his friend Kunal joined him. They walked 5 m together in the same direction and then Rohit turned left whereas Kunal turned to his right, travelling 10 m and 7 m respectively. Kunal turns left to travel 5 m followed by 2 m towards right to reach his office. Rohit turns to right and travels 5 m and reaches his office. What is the distance between the two offices and in which direction was Kunal travelling at the end?
(A) 17 m, West (B) 17 m, East
(C) 19 m, North (D) 19 m, South
- One evening Suma and her friend Rama are standing opposite each other. Suma found that her shadow is falling towards her right which direction is Rama facing?
(A) South (B) North
(C) East (D) West

12. One morning, Piyush and Ravi were talking, facing each other. It was observed that Piyush's shadow fell to his left. Then, which direction was Ravi facing?
 (A) South (B) North-east
 (C) North (D) South-west
13. A clock is so placed that at 3 p.m. the minute hand points towards North-West. In which direction does the hour hand point at 9 a.m.?
 (A) North-east (B) West
 (C) South-west (D) South
14. When a watch shows 3:45, the minute hand points towards East. When the watch shows 6 O' clock in which direction will the hour hand points?
 (A) North-west (B) West
 (C) South (D) North
15. My school is to the East of my house. My father's office is to the South-West of my school. A park is to the South of my school. In which direction is my house located with respect to the park?
 (A) East (B) North-west
 (C) South-east (D) North-east
16. A compass was damaged and its needle turned in such a manner that the pointer which was showing East is now showed North. One person went towards West as per the above mentioned compass. In which direction did he actually go?
 (A) South (B) West
 (C) North-east (D) North
17. A watch shows 5:15. If the minute hand points to the West, then in which direction will the hour hand point?
 (A) North-west (B) West
 (C) South-east (D) East
18. Shrimaan went to the station 15 km towards the North of his house. His wife Shrimati went to the market towards the West which is 8 km from the house. At this instant when both have reached their destinations, they start walking towards each other at the same time with the same speed along the shortest route between the station and the market. Where do they meet?
 (A) 8.5 km midway (B) 17 km midway
 (C) 10 km midway (D) 25 km midway
19. After travelling 10 kms, I turned left and travelled a distance of 5 km, then turned right and covered a distance of 5 km. Now I am moving towards West. Towards which direction did I start my journey?
 (A) North (B) South
 (C) East (D) West

Directions for questions 20 and 21: These questions are based on the following information.

Q is 8 m to the north of P and 7 m to the west of R. S is 3 m to the north of R. T is 6 m to the east of S. U is 11 m to the south of T and 4 m to the west of V.

20. In which direction is P with respect to V?
 (A) East (B) West
 (C) North (D) South-east

21. How far is R from U?
 (A) 9 m (B) 8 m
 (C) 10 m (D) 12 m

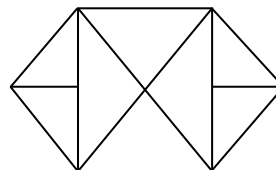
Directions for questions 22 and 23: These questions are based on the following information.

City A is 10 km to the south of city B, which is 20 km to the west of city E. D is 30 km to the south of city C. City F is 10 km to the east of city B and 15 km to the south of city C.

22. In which direction is city 'A' with respect to city 'D'?
 (A) South-west (B) North-west
 (C) East (D) West
23. What is the approximate distance between city 'C' and city 'E'?
 (A) 17 km (B) 16 km
 (C) 18 km (D) 19 km

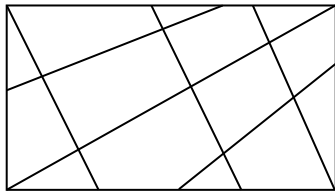
Directions for questions 24 to 30: Select the correct alternative from the given choices.

24. In a cricket tournament, 32 teams participate. In each round, a team plays with exactly one more team. The winner of the match is moved to the next round, while the loser is eliminated. How many rounds are played to decide the winner (Assume there are no draws)?
 (A) 4 (B) 6 (C) 5 (D) 7
25. In a chess tournament, 15 players participate. In the first round, one player is awarded a bye and seeded directly to the next round. Each of the remaining players is played against exactly by one player. The winner of the match is moved to the next round while the loser is eliminated. Overall, how many matches are played (Assume there are no draws)?
 (A) 14 (B) 16 (C) 10 (D) 8
26. In a class, Pranav's rank is 15th from the top and 36th from the bottom among the students who passed. If 12 students did not attend the exam and 15 students failed, what is the total number of students in the class?
 (A) 76 (B) 77 (C) 78 (D) 79
27. In a class the ratio between girls and boys is 35 : 56. If Ram's rank is 25th from the top and 25th from the bottom, among those who passed and 21st from top and 37th from the bottom among all the boys, what is the ratio of the number of passed students to the number of failed students?
 (A) 5 : 6 (B) 1 : 2 (C) 7 : 13 (D) 6 : 11
28. Find the number of triangles embedded in the given figure.



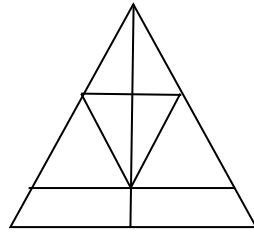
- (A) 12 (B) 14
 (C) 10 (D) more than 14

29. Find the number of triangles embedded in the given figure.



- (A) 8 (B) 10
(C) 12 (D) more than 12

30. How many triangles are there in the given figure?



- (A) 10 (B) 12 (C) 14 (D) 16

Key

Exercise – 4

- | | | | | | |
|------|-------|-------|-------|-------|-------|
| 1. D | 6. B | 11. A | 16. D | 21. C | 26. B |
| 2. C | 7. D | 12. A | 17. A | 22. B | 27. C |
| 3. A | 8. C | 13. C | 18. A | 23. C | 28. B |
| 4. B | 9. D | 14. D | 19. D | 24. C | 29. D |
| 5. B | 10. D | 15. B | 20. B | 25. A | 30. D |