DISTANCE & DIRECTION

In almost all the Objective Type Multiple Choices Examinations a few questions on Distance and Direction are asked regularly.

In this type of questions a successive follow-up of directions and/or distance is formulated and on the basis of given information you are required to ascertain the final direction with respect to the starting point or the shortest distance between the starting point and the final point. Sometimes both the final direction and the distance covered are asked. Thus, in this test, the questions consists of a sort of direction and/or distance puzzle. Obviously, such questions are meant to judge the candidate’s ability to trace, follow and perceive the direction, described in somewhat complicated language, correctly. In order to solve such questions correctly you must have the knowledge of directions on the plane of a paper. At the same time, it is necessary to sketch out the directions as per the information provided in the question in proper sequence. An error at any point would alter your answer choice.

The diagram given below shows the four main directions (cardinals) and the four subsidiary directions on a plane of paper:

Generally right and left turns are frequently employed in the questions in order to confuse the candidates. Remember that examiner does possess the uncanny knack and he/she may confuse you by making verbose statements also. But, there is nothing to panic. You may note that on the surface of paper, the direction of right turn is always clockwise and that of left turn is anticlockwise. Thus,

Now try to comprehend the following deductions:
(i) A person facing towards North, on taking left turn will face towards West and on taking the right turn towards East.

Left turn means anticlockwise rotation and right turn means clockwise rotation. Thus,
(ii) A person facing towards South, on taking left turn will face towards East and on taking right turn towards West.

(iii) A person facing towards East, on taking left turn will face towards North and on taking right turn towards South.

(iv) A person facing towards West, on taking left turn will face towards South and on taking right turn towards North.

(v) A person facing towards North-West, on taking left turn will face towards South-West and on taking right turn towards North-East.

(vi) A person facing towards South-West on taking left turn will face towards South-East and on taking right turn towards North-West.

(vii) A person facing towards South-East, on taking left turn will face towards North-East and on taking right turn towards South-West.

(viii) A person facing towards North-East, on taking left turn will face towards North-West and on taking right turn towards South-East.

In order to determine the distance travelled or the shortest straight distance between the two given points, the Pythagoras formula

\[ h^2 = b^2 + p^2 \]

proves to be helpful.

Here,
- \( h \) = Hypotenuse
- \( p \) = Perpendicular
- \( b \) = Base
Now consider the following examples to understand the nature and pattern of the questions on Distance and Direction Test:

**Ex.1.** Early morning after sunrise, Rajesh was standing infront of his house in such a way that his shadow was falling exactly behind him. He starts walking straight and walks 5 metres. He turns to his left and walks 3 metres and again turning to his left walks 2 metres. Now in which direction is he from his starting point?

**Answer:** The shadow of Rajesh was falling exactly behind him. It implies that he was facing towards East.

It is clear from the diagram that Rajesh was in North-East with reference to the starting point.

**Ex.2.** From a point P Sameer starts walking towards South and after walking 40 metres, he turns to his left and walks 30 metres and reaches point F. In which direction is he with reference to the starting point P?

**Answer:** The movement of Sameer can be shown by the diagram given below:

Clearly, Sameer is to the Southeast of Point P.

**Ex.3.** A, B, C and D are playing a game of cards. A and B are partners. D faces towards North. If A faces towards West, who will face towards South?

**Answer:**

In a game of cards both partners face each other, i.e., if one partner faces towards East, the other partner will invariably face towards West. A and B are partners, therefore, C and D would be partners. Now D faces towards North and hence C will face towards South.

**Ex.4.** Praveen travels 23 metres towards south, then he turns left and travels 30 metres, then turns right and travels 15 metres. How far is he from the starting point and in which direction?

**Answer:** The movement of Praveen can be shown as:

From the diagram it is clear that Praveen is in Southeast direction with respect to the starting point.

**Required distance = AD**

From Pythagorus formula

\[(AD)^2 = (AE)^2 + (ED)^2\]

or, \[(AD)^2 = (AB + BE)^2 + (30)^2\]

or, \[(AD)^2 = (25 + 15)^2 + 900\]

or, \[AD = \sqrt{1800 + 900} = \sqrt{2500}\]

\[\therefore AD = 50m.\]

**Ex.5.** After walking 6 km I turned to my right and walked 2 km. Then I turned to my left and walked 10 km. Finally, I was going towards South. In which direction I did start my journey?

**Answer:**

It is clear from the diagram that I did start my journey towards South.

**Note:** In such type of questions we should start tracing the given follow-up in reverse manner i.e., from final point to starting point and thereby taking right turn as left turn and vice-versa.
Now consider some more examples on Distance and Direction

1. Sheela walks from A to B which is 2 km away, turns right at 90° and walks for 3 km to point C, turns right at 90° and walks to D which is 8 km away, turns 90° right and goes 3 km to point K. Then, once again she turns right, 90° and walks 4 km to point F. How far is it from A to F?
   (1) 2 km
   (2) 4 km
   (3) 6 km
   (4) 8 km

2. Mohan starts from point A and walks 1 km towards south, turns left and walks 1 km. Then he turns left again and walks 1 km. Now he is facing
   (1) East
   (2) West
   (3) North
   (4) South-west

3. Sohan started from point X and travelled forward 8 km up to point Y, then turned towards right and travelled 5 km up to point Z, then turned right and travelled 7 km up to point A and then turned towards right and travelled 5 km up to B. What is the distance between point B and X?
   (1) 1 km
   (2) 2 km
   (3) 3 km
   (4) 4 km

4. A child is looking for his father. He went 90 metres in the east before turning to his right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not there. From here he went 100 metres to his north before meeting his father in a street. How far did the son meet his father from the starting point?
   (1) 90 m
   (2) 100 m
   (3) 260 m
   (4) 140 m

5. K is a place which is located 2 km away in the north-west direction from the capital P. R is another place that is located 2 km away in the south-west direction from K. M is another place and that is located 2 km away in the north-west direction from R. T is yet another place that is located 2 km away in the south-west direction from M. In which direction is T located in relation to P?
   (1) South-west
   (2) North-west
   (3) West
   (4) North

6. Vijit walks 10 metres westward, then turns left and walks 10 metres. He then again turns left and walks 10 metres. He takes a 45 degree turn rightwards and walks straight. In which direction is he walking now?
   (1) South
   (2) West
   (3) South-East
   (4) South-West

7. Sanmitra walked 8 m towards the north. He turned to his right and walked 16m, then turned to his left and walked 5 m and again he turned to his left and walked 16m. Now how far is he from his starting point?
   (1) 32 m
   (2) 23 m
   (3) 13 m
   (4) 16 m

8. Leela starts from a point and walks 1 km east and then turns left and walks 2 km and turns right and walks 2 km again. She starts towards a point 2 km towards her right, from where again she walks 1 km left. How far is she from the starting point?
   (1) 3 km
   (2) 4 km
   (3) 5 km
   (4) 2 km

9. Karan facing towards south moved straight 2 Ion and from there turned to his right 90° and travelled 2 km. Then he took a 45° turn to his left and travelled 1 km. Where would he be now with respect to the starting point?
   (1) South region
   (2) South-east region
   (3) North-west region
   (4) South-west region

10. Raju is Ramu's neighbour and he stays 100 metres away towards southeast. Venu is Raju's neighbour and he stays 100 metres away towards southwest. Khader is Venu's neighbour and he stays 100 metres away towards northwest. Then where is the position of Khader's home in relation to Ramu's?
   (1) South-East
   (2) South-West
   (3) North-West
   (4) North

11. Sanmitra walks 4 kms. towards north, turns right and walks 5 k.m. Then he turns towards south and walks 2 k.m. Again he takes a turn towards west walks 3 km and stops for a while. Then he further walks 2 km. What is the distance of Sanmitra from starting point?
   (1) 16 k.m.
   (2) 2 k.m.
   (3) 4 k.m.
   (4) 3 k.m.

[4 and 5 : SSC Graduatae Level Tier-I exam, 16.05.2010]

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   (1) South
   (2) West
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   (1) 32 m
   (2) 23 m
   (3) 13 m
   (4) 16 m

8. Leela starts from a point and walks 1 km east and then turns left and walks 2 km and turns right and walks 2 km again. She starts towards a point 2 km towards her right, from where again she walks 1 km left. How far is she from the starting point?
   (1) 3 km
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   (3) 5 km
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   (1) South region
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   (1) South-East
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11. Sanmitra walks 4 kms. towards north, turns right and walks 5 k.m. Then he turns towards south and walks 2 k.m. Again he takes a turn towards west walks 3 km and stops for a while. Then he further walks 2 km. What is the distance of Sanmitra from starting point?
   (1) 16 k.m.
   (2) 2 k.m.
   (3) 4 k.m.
   (4) 3 k.m.

[10 and 11: SSC Stenographer (Grade 'C' & 'D' Exam, 09.01.2011]

EXPLANATIONS

1. (1)
   Distance between A and F = 2 km

2. (3)
   It is clear from the diagram that Mohan is facing towards North.

3. (i) X
   5 km
   7 km
   It is clear from the diagram that Mohan is facing towards North.
4. (2)

Required distance = \( AF = \sqrt{(80)^2 + (60)^2} \)
\( \sqrt{6400 + 3600} = \sqrt{10000} = 100 \text{m} \)

5. (3)

It is clear that \( T \) is located to the West of \( P \).

6. (4)

10m Starting Point

7. (3)

Starting Point

Required distance = \( AE = AB + BE + (8 + 5) \text{ m} = 13 \text{m} \)

8. (2)

Required distance = \( AB + BE + EF = (1 + 2 + 1) \text{ Km} = 4 \text{ Km} \)

9. (4)

Karan is in South-West region with respect to his starting point.

10. (3)

11. (2)