1. A whale swims due east (from 0 km) a distance of 5 km, turns around and goes due west for 2 km and finally turns around again and heads 4 km due east.

A. What is the total distance traveled? \[5 + 2 + 4 = 11\]

B. What is the displacement (change in position)?

\[x_f - x_i = \Delta x\]

\[7 - 0 = 7\]
Problems 2-6

<table>
<thead>
<tr>
<th></th>
<th>Motion</th>
<th>distance traveled</th>
<th>ΔX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>An object moves from point 1 to point 4 then reverses and ends at point 2.</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>An object moves from point 1 to point 5 then reverses to point 2.</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>An object moves from point 1 to point 3 then reverses to 0.</td>
<td>5</td>
<td>-1</td>
</tr>
<tr>
<td>5</td>
<td>An object moves from point 3 to point 5 and then reverses to point 1.</td>
<td>6</td>
<td>-2</td>
</tr>
<tr>
<td>6</td>
<td>An object moves from point 2 to point 4 and reverses to point 2.</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
7.

A person begins at 0 and walks 5 meters to the right, turns around and walks 8 meters to the left.

A. What is the displacement?
B. What is the total distance?

\[ x_f - x_i = \Delta x \]

\[ -3 - 0 = -3 \]

\[ 5 + 8 = 13 \]
8.

If you walk exactly four times around a quarter-mile track, what is your displacement?

- one mile
- one-half mile
- one-quarter mile
- zero

Displacement is the same thing as change in position.

$$X_f - X_i = \Delta X$$

$$0 - 0 = 0$$
In your car, you leave your favorite parking spot and drive 4 km east on Main Street to go to the grocery store. After shopping, you go back home by traveling west on Main Street and find your favorite parking spot is still available.

A. What is your distance traveled? \[ 4 + 4 = 8 \text{ km} \]

B. What is your displacement? \[ x_f - x_i = \Delta x \]
\[ 4 - 0 = 4 \]
10.

Suppose that you run along 3 different paths from location A to location B. Along which path(s) would your distance traveled be different than your displacement?
11.

You run from your house to a friend’s house that is 3 miles away. You then walk home.

Your House

3 miles

Friend’s House

a. What distance did you travel? 3 miles + 3 miles = 6 miles

b. What was the displacement for the entire trip? \( \Delta x = x_f - x_i \)

\[
\frac{3 - 0}{3} = 3
\]
12. A cross-country skier moves from location A to location B, from B to C, from C to D.

A. What is the total displacement of the skier?
   \[120 \text{ km} - 0 \text{ km} = 120 \text{ km}\]

B. What is the total distance traveled by the skier?
   \[A - B = 160 \text{ km}, \quad B - C = 120 \text{ km}, \quad C - D = 80, \quad 160 + 120 + 80 = 360 \text{ km}\]
The position time graph represents the motion of South's basketball coach during the last sixteen seconds of overtime during this past weekend's game.

\[8 \text{m} + 4 \text{m} + 4 \text{m} + 8 \text{m} = 24 \text{ m}\]

A. Determine the total distance walked by the coach.
B. Determine the displacement of the coach. \(0 - 0 = 0\)
C. Determine the displacement of the coach after 12 seconds.
\[12 - 0 = 12 \text{ m}\]
John left his home and walked 3 blocks to school as is shown in the graph below.

Which interpretation best explains the part of the graph between "B" and "C"?

A. John arrived at school and stayed.
B. John stopped and waited before crossing a busy street.
C. John went back home to get his math book.
D. John got to the top of the hill and began walking on level ground.