

2008 Two Dimensions 1

Let's ensure you know the Pythagorean theorem: $A^2 + B^2 = C^2$, where A and B are the two sides of a right triangle and C is the hypotenuse (long side).

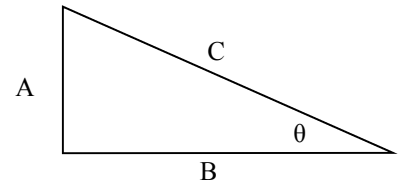
If $A = 8\text{m}$ and $B = 17\text{m}$, then:

$$8^2 + 17^2 = C^2$$

$$64 + 289 = C^2$$

$$353 = C^2$$

$$\sqrt{353} \approx 18.8\text{m} = C$$



As always, show your work.

- If $A = 4\text{m}$ and $B = 12\text{m}$, find C .

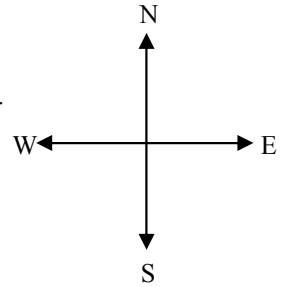
Don't outthink the following questions. Notice the compass directions at the right if you are confused.

- Positive or Negative?

- | | |
|--|--|
| A. <input type="checkbox"/> Walking east? | C. <input type="checkbox"/> Walking south? |
| B. <input type="checkbox"/> Walking north? | D. <input type="checkbox"/> Walking west? |

- Δx or Δy ?

- | | |
|--|--|
| A. <input type="checkbox"/> Walking east? | C. <input type="checkbox"/> Walking south? |
| B. <input type="checkbox"/> Walking north? | D. <input type="checkbox"/> Walking west? |



- A person walks 4 m north, then 8 m south, then, totally confused, walks another 10 m north. Find their displacement. (If they started at the origin, where did they end up?)

Write each individual displacement, keeping track of + and -, then solve.

- Another confused person walks 15 m east, then 20 m west, then 2 m east. What is their displacement?

- A third, VERY confused person walks 30 m west, then 10 m north, then 5 m south, then 40 m east, then another 6 m north.
 - Find Δx .
 - Find Δy .

- Using the Pythagorean theorem, find their total displacement (use Δy and Δx as A and B [doesn't matter which], C is the total displacement).

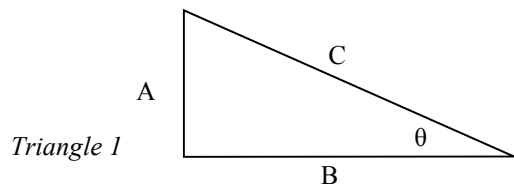
- (As you did before.) A FOURTH PHENOMENALLY confused person walks 50 m north, 12 m east, 60 m west, 10 m south, and another 5 m south. Find the person's total displacement.

From the "Trigonometry Basics" notes:

- Which symbol do we use for any angle?

- In triangle 1 at the right,

- Which side is the hypotenuse?
- Which side is opposite the angle?
- Which side is adjacent to the angle?

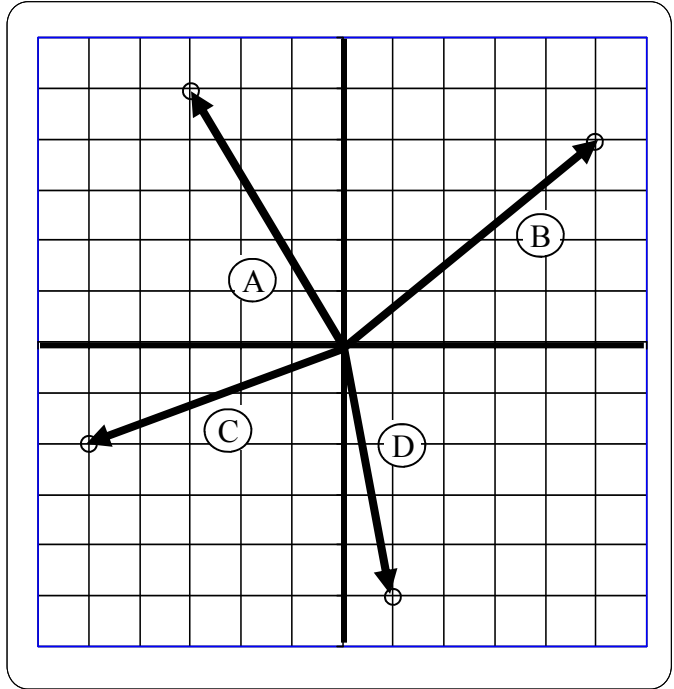


More on back

Two Dimensions I

Let me explain the grid. The non-arrow black lines are the x and y axis. The arrow represent motion (vectors). Each vector starts at the origin (0,0) and ends at the end of the arrow (the circle). (I assume you know which is the x and y axis and which directions are positive and negative.) To simplify things, let's make each square equal to only 1 meter. When I ask for Δx or Δy I am asking for how far the object moves in the x direction and y direction from its start to its end. Since each arrow starts at the origin, the displacements are the x and y coordinates of the final position (since initial positions are 0,0). ALSO—Some displacements can be negative!!!!

10. Which arrows have negative y coordinates?
11. Which arrows have negative x coordinates?
12. For Arrow B:
 - A) $\Delta x = \underline{\hspace{2cm}}$; $\Delta y = \underline{\hspace{2cm}}$.
 - B) Using Δx and Δy as A and B, find the total displacement of Arrow B (find "C").



13. For Arrow A: (notice negatives)
 - A) $\Delta x = \underline{\hspace{2cm}}$; $\Delta y = \underline{\hspace{2cm}}$.
 - B) Find the total displacement of Arrow A.

14. For Arrow C:
 - A) $\Delta x = \underline{\hspace{2cm}}$; $\Delta y = \underline{\hspace{2cm}}$.
 - B) Find the total displacement of Arrow C.

15. Find the total displacement of Arrow D.

Also from the "Trigonometry Basics" notes:

16. $\sin 70^\circ =$
17. Use the triangle at the right to answer the following:
 - A. opposite =
 - B. Adjacent =
 - C. Hypotenuse =
 - D. $\theta =$
 - E. Following the example at the bottom of the notes, calculate Y.

