

Work each of the following problems. SHOW ALL WORK.

1. A student walks 5 m to the east then another 3 m in the same direction.

a. Draw the vectors that represent each portion of the student's motion.



b. Draw the vector from the student's initial position to her final position (the resultant).



c. At the end of the walk, how far is the student from her starting position?

$$5\text{ m} + 3\text{ m} = 8\text{ m}$$

2. A train leaves the town of Grantville at 8:00 a.m., stops at Harrison (20 km from Grantville) at 10:00 a.m., and arrives at Greentown (15 km from Harrison) at 12:00 p.m.

a. How long (time) was the trip? Is your answer a scalar or a vector?

$$8:00\text{ a.m.} - 12:00\text{ p.m.} = 4\text{ hours}$$

Time is a scalar quantity.

b. Draw the vectors that represent each portion of the train's trip.



c. Draw the vector from the train's initial position to its final position (the resultant).



d. What is the total distance from Grantville to Greentown in kilometers? Is your answer a scalar or a vector?

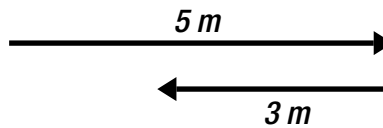
$$20\text{ km} + 15\text{ km} = 35\text{ km}$$

Distance is a scalar quantity.

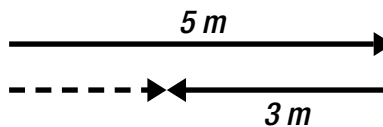
Work each of the following problems. SHOW ALL WORK.

3. A student walks 5 m to the east then 3 m to the west.

a. Draw the vectors that represent each portion of the student's motion.



b. Draw the vector from the student's initial position to his final position (the resultant).

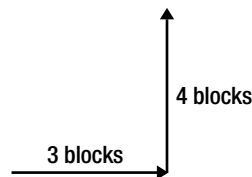


c. At the end of the walk, how far is the student from his starting position?

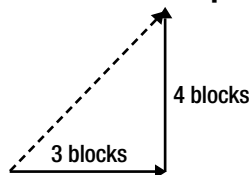
$$5\text{ m} - 3\text{ m} = 2\text{ m}$$

4. A bus travels three blocks east then turns left and heads four blocks north.

a. Draw the vectors that represent each portion of the bus's motion.



b. Draw the vector from the bus's initial position to its final position (the resultant).



c. At the end of the drive, how far is the bus from its starting position?

$$c^2 = a^2 + b^2$$

$$c^2 = (3\text{ blocks})^2 + (4\text{ blocks})^2$$

$$c^2 = 9\text{ blocks}^2 + 16\text{ blocks}^2$$

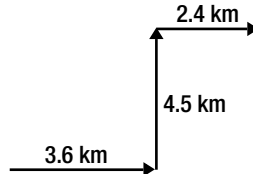
$$c^2 = 25\text{ blocks}^2$$

$$c = 5\text{ blocks}$$

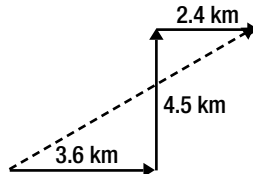
Work each of the following problems. SHOW ALL WORK.

5. An athlete from your school's cross country team goes for a training run. She runs 3.6 km east, 4.5 km north, then another 2.4 km east.

- a. Draw the vectors that represent each portion of the student's run.



- b. Draw the vector from the student's initial position to her final position (the resultant).



- c. At the end of her run, how far is the athlete from her starting position?

Total horizontal distance from origin: 6.0 km

Total vertical distance from origin: 4.5 km

$$c^2 = a^2 + b^2$$

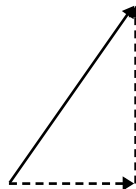
$$c^2 = (6.0 \text{ km})^2 + (4.5 \text{ km})^2$$

$$c^2 = 36 \text{ km}^2 + 20.25 \text{ km}^2$$

$$c^2 = 56.25 \text{ km}^2$$

$$c = 7.5 \text{ km}$$

6. Resolve the two-dimensional vector below into horizontal and vertical vectors:



7. Resolve the two-dimensional vector below into horizontal and vertical vectors:

