

Work each of the following problems. SHOW ALL WORK.

1. A cart rolls 2 m to the right then rolls back 1 m to the left.

a. What is the total distance rolled by the cart?

b. What is the displacement of the cart from the initial to the final positions?

2. A child observes a caterpillar walking on a window sill. The caterpillar walks 18 cm to the left, then 6 cm to the right, then 10 cm to the left.

a. What is the total distance walked by the caterpillar?

b. What is the displacement of the caterpillar?

3. A ball is thrown upward from an initial height of 1.5 m. The ball reaches a height of 5 m then falls to the ground.

a. What is the total distance traveled by the ball?

b. What is the displacement of the ball?

4. The path from the subway station to the art museum is three blocks to the north then four blocks to the west. What is the straight-line distance in blocks from the subway station to the art museum?

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5. When looking at a map, a student realizes that Birmingham is nearly due west of Atlanta, and Nashville is nearly due north of Birmingham. If the distance from Atlanta to Birmingham is roughly 150 mi, and the distance from Birmingham to Nashville is roughly 200 mi, what is the estimated distance from Atlanta to Nashville?
6. A local sign company needs to install a new billboard. The signpost is 30 m tall, and the ladder truck is parked 24 m away from the bottom of the post due to an uneven ravine. How long must the ladder be in order to reach the top of the signpost from the ladder truck?
7. In order to hike around a portion of Lake Allatoona, a tour guide determines that he must take his group 150 m east, 60 m north, then 75 m west. What is the displacement of the tour group from its initial to final position on opposite sides of the lake?

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8. A student wants to estimate the height of a tree from ground level. He measures the length of its shadow as 10 m and the angle from the top of the shadow on the ground to the top of the tree as 60° . What is the height of the tree based on these measurements?
9. The distance from Atlanta to Macon is about 80 mi at 58.5° south of east. What distances due east and due south must you drive in order to travel from Atlanta to Macon?

Work each of the following problems. SHOW ALL WORK.

10. A pizza delivery driver must make three stops on her route. She will first leave the restaurant and travel 4 km due north to the first house. The next house is 6 km away at 45° south of west according to her map. The final stop is 5 km away at 60° north of west. What is her displacement from the restaurant to the final stop?