

Practice Problems

5.1 Vectors

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1. A car is driven 125.0 km due west, then 65.0 km due south. What is the magnitude of its displacement? Solve this problem both graphically and mathematically, and check your answers against each other.

$$\begin{aligned}
 R^2 &= A^2 + B^2 \\
 R &= \sqrt{A^2 + B^2} \\
 &= \sqrt{(65.0 \text{ km})^2 + (125.0 \text{ km})^2} \\
 &= 141 \text{ km}
 \end{aligned}$$



2. Two shoppers walk from the door of the mall to their car, which is 250.0 m down a lane of cars, and then turn 90° to the right and walk an additional 60.0 m. What is the magnitude of the displacement of the shoppers' car from the mall door? Solve this problem both graphically and mathematically, and check your answers against each other.

$$\begin{aligned}
 R^2 &= A^2 + B^2 \\
 R &= \sqrt{A^2 + B^2} \\
 &= \sqrt{(250.0 \text{ m})^2 + (60.0 \text{ m})^2} \\
 &= 257 \text{ m}
 \end{aligned}$$



3. A hiker walks 4.5 km in one direction, then makes a 45° turn to the right and walks another 6.4 km. What is the magnitude of her displacement?

$$\begin{aligned}
 R^2 &= A^2 + B^2 - 2AB \cos \theta \\
 R &= \sqrt{A^2 + B^2 - 2AB \cos \theta} \\
 &= \sqrt{(4.5 \text{ km})^2 + (6.4 \text{ km})^2 - 2(4.5 \text{ km})(6.4 \text{ km})(\cos 135^\circ)} \\
 &= 1.0 \times 10^1 \text{ km}
 \end{aligned}$$

4. An ant is crawling on the sidewalk. At one moment, it is moving south a distance of 5.0 mm. It then turns southwest and crawls 4.0 mm. What is the magnitude of the ant's displacement?

$$\begin{aligned}
 R^2 &= A^2 + B^2 - 2AB \cos \theta \\
 R &= \sqrt{A^2 + B^2 - 2AB \cos \theta} \\
 &= \sqrt{(5.0 \text{ mm})^2 + (4.0 \text{ mm})^2 - 2(5.0 \text{ mm})(4.0 \text{ mm})(\cos 135^\circ)} \\
 &= 8.3 \text{ mm}
 \end{aligned}$$

Chapter 5 Physics Study Guide Answers

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Wolfson, Jay M. Pasachoff**



Chapter 5 Physics Study Guide Answers:

This book delves into Chapter 5 Physics Study Guide Answers. Chapter 5 Physics Study Guide Answers is a crucial topic that must be grasped by everyone, ranging from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Chapter 5 Physics Study Guide Answers, encompassing both the fundamentals and more intricate discussions.

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