## DRILL

## **CHAPTER 2 PRACTICE QUESTIONS**

**Directions:** Complete the following problems as specified by each question, and then check your work using the solutions that follow. For extended, step-by-step solutions, access your Student Tools online.

- 1. Convert the following:
  - (a)  $3.6 \times 10^3 \,\mu\text{m}$  to m (express result in scientific notation)
  - (b) 15 miles to kilometers
  - (c) 250 cm<sup>3</sup> to in<sup>3</sup>
  - (d) 45 kph to mph
- Seawater is about 3.5% salt by weight and has a density of about 1000 kg/m<sup>3</sup>. What weight of salt is contained in 1 cm<sup>3</sup> of seawater?
- **3.** Consider the following triangle:



What is the

- (a)  $\cos(\theta)$
- (b)  $\cos(\phi)$
- (c)  $sin(\theta)$

- **4.** Prove that division of scalars is not associative.
- 5. What are the components of a vector that points 10 m from the origin at 38° above the *x*-axis?
- 6. Vector  $\vec{a}$  has a magnitude of 5 and makes an angle of 67° with the *x*-axis. Describe this vector algebraically.
- 7. Consider the following vectors:

 $\vec{a} = (4 \text{ m})\hat{i} + (3 \text{ m})\hat{j} - (1 \text{ m})\hat{k}$ 

 $\vec{b} = (2 \text{ m})\hat{i} + (1 \text{ m})\hat{k}$ 

Find the following values:

- (a)  $\vec{a} + \vec{b}$ (b)  $\vec{a} - \vec{b}$
- (c)  $\vec{a} \cdot \vec{b}$
- (d)  $\vec{a} \times \vec{b}$

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- **8.** What is the dot product of the two vectors in **10.** What is the result of  $\vec{a} \cdot (\vec{a} \times \vec{b})$ ? the following figure?



- 9. An object begins at an initial position  $\vec{l}_1 = (4 \text{ m})\hat{l} + (2 \text{ m})\hat{j}$ . If it is moved by  $\Delta \vec{r} = -(1 \text{ m})\hat{i} + (2 \text{ m})\hat{j},$ 
  - (a) What is the object's final position?
  - (b) How far is that from the origin?