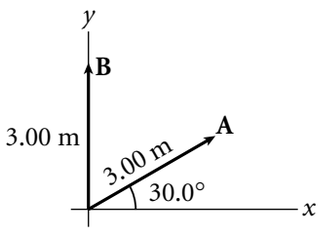
ANSWERS

1. A scalar represents the magnitude of a physical quantity.
2. no, must be equal and opposite
3. Speed is the magnitude of velocity.
4. 30 m/s east
5. no, because the scalar has no direction
6. **a.** 5.00 units at 53.1° below the positive *x*-axis
   b. 5.00 units at 53.1° above the positive *x*-axis
   c. 8.54 units at 69.4° below the positive *x*-axis
   d. 5.00 units at 127° clockwise from the positive *x*-axis
7. **a.** 5.20 m at 60.0° above the positive *x*-axis
   b. 3.00 m at 30.0° below the positive *x*-axis
   c. 3.00 m at 150° counterclockwise from the positive *x*-axis
   d. 5.20 m at 60.0° below the positive *x*-axis
8. 7.9 m at 4.3° north of west
9. 15.3 m at 58.4° south of east
10. when the vectors point in the same direction
11. a car moving straight and speeding up, a car moving straight and slowing down
12. 55; the maximum value of the vector sum is 80 units, the minimum value is 30 units
13. Yes, the distance from the tail of the first vector to the head of the last vector is zero.

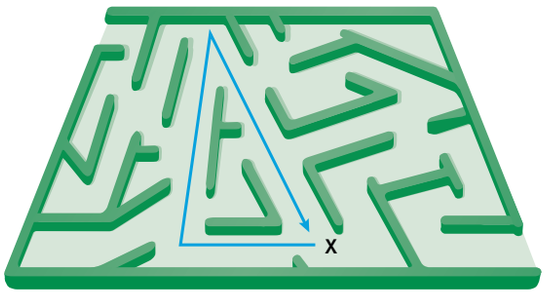
VECTORS AND THE GRAPHICAL METHOD

Review Questions

1. The magnitude of a vector is a scalar. Explain this statement.
2. If two vectors have unequal magnitudes, can their sum be zero? Explain.
3. What is the relationship between instantaneous speed and instantaneous velocity?
4. What is another way of saying –30 m/s west?
5. Is it possible to add a vector quantity to a scalar quantity? Explain.
6. Vector **A** is 3.00 units in length and points along the positive *x*-axis. Vector **B** is 4.00 units in length and points along the negative *y*-axis. Use graphical methods to find the magnitude and direction of the following vectors:
   a. **A** + **B**
   b. **A** – **B**
   c. **A** + 2**B**
   d. **B** – **A**
7. Each of the displacement vectors **A** and **B** shown in the figure below has a magnitude of 3.00 m. Graphically find the following:
   a. **A** + **B**
   b. **A** – **B**
   c. **B** – **A**
   d. **A** – 2**B**



8. A dog searching for a bone walks 3.50 m south, then 8.20 m at an angle of 30.0° north of east, and finally 15.0 m west. Use graphical techniques to find the dog's resultant displacement vector.
9. A man lost in a maze makes three consecutive displacements so that at the end of the walk he is back where he started, as shown below. The first displacement is 8.00 m westward, and the second is 13.0 m northward. Use the graphical method to find the third displacement.



Conceptual Questions

10. If **B** is added to **A,** under what conditions does the resultant have the magnitude equal to $A + B$?
11. Give an example of a moving object that has a velocity vector and an acceleration vector in the same direction and an example of one that has velocity and acceleration vectors in opposite directions.
12. A student accurately uses the method for combining vectors. The two vectors she combines have magnitudes of 55 and 25 units. The answer that she gets is either 85, 20, or 55. Pick the correct answer, and explain why it is the only one of the three that can be correct.
13. If a set of vectors laid head to tail forms a closed polygon, the resultant is zero. Is this statement true? Explain your reasoning.