Chapter 8 Vectors Review:
Topics: identify vector quantities (p.482), represent a vector geometrically (p.483), find the resultant of two vectors (p. 434), operations with vectors (p.485), rectangular components of vectors (p. 487), express a vector in component form (p.492, p.495), find direction angle (p.496), magnitude of vectors (p.493), operations with vectors using components (p. 493), find a unit vector with the same direction as a given vector (p.494), write a vector as a linear combination of unit vectors (p. 495), vector application problems (p.486, p.496)

1. State whether each quantity is a vector quantity:
   i. a car driving 50 mph due east
   ii. a gust of wind blowing 5 mph
   iii. walking 4km east of west
   iv. pushing down on an object with 7 Newtons of force

2. Use a ruler and a protractor to draw an arrow diagram for v = 10 newtons of force at 30° to the horizontal. Include a scale on the diagram.

3. Find the resultant of:
   Vector 1: 2 kilometers N30°W
   Vector 2: 2 kilometers directly east

4. An airplane is flying with an airspeed of 475 miles per hour on a heading of 070°. If an 80-mile-per-hour wind is blowing from a true heading of 120°, determine the velocity and direction of the plane relative to the ground.

5. Will pushes a shovel into the ground with a force of 630 newtons at an angle of 70° with the ground. Draw a diagram that shows the vector and its rectangular components. Then calculate the rectangular components.

6. A. Find the component form of a vector with an initial point $A(1, -3)$ and terminal point $B(1, 3)$

   B. Find the component form of a vector with an initial point $C(-4, -3)$ and terminal point $D(5, 3)$

7. A. Find the magnitude of a vector with initial point $A(1, -3)$ and terminal point $B(1, 3)$

   B. Find the magnitude of a vector with initial point $C(4, -2)$ and terminal point $D(-3, -2)$

8. Find 2w + y for $w = \langle 2, -5\rangle$, $y = \langle 2, 0\rangle$, and $z = \langle -1, -4\rangle$

9. A. Find a unit vector u with the same direction as $v = \langle 4, -2\rangle$.

   B. Find a unit vector u with the same direction as $w = \langle 5, -3\rangle$.

10. A. A vector has initial point $D(-4, 3)$ and terminal point $E(-1, 5)$. Rewrite the vector as a linear combination of the vectors i and j.

    B. Vector=$\langle 2, 9\rangle$ Rewrite the vector as a linear combination of the vectors i and j.

11. Find the component form of the vector v with magnitude 7 and direction angle 60°.

12. A. Find the direction angle of r = –7i + 2j to the nearest tenth of a degree.
    B. Find the direction angle of $p = \langle 2, 9\rangle$ to the nearest tenth of a degree.

13. A soccer player running forward at 7 meters per second kicks a soccer ball with a velocity of 30 meters per second at an angle of 10° with the horizontal. What is the resultant speed and direction of the kick?