Warm Up

1. What is the recoil (acceleration) of a cannon with a mass of 100 kg if it fired a projectile with a mass of 15 kg with an acceleration of 5.0×10^6 m/s^2?
2. What is the position of a volleyball that was hit with an upward velocity of 25.0 m/s at an initial height of 1.2 m at time 1.45 sec?
3. If the weight of an object when an elevator stops is 750 N, what is the change in acceleration of the elevator if the person has a mass of 72 kg?

Target

- I can solve for vectors by using sin, cos, and tan.

Vectors

- Vectors have a magnitude and direction associated with it.
- Vectors can include the x and y axis.

- The Pythagorean Theorem can be used to find the resultant vector if they form a right angle.
- If we do not have a right angle, we can use other equations to find and solve vectors.

Practice

- 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^{o} to the right and walk an additional 60.0 m. What is the magnitude of the displacement?
- 257 m

- If you are looking for the x vector, we use $v_x = v \cos \theta$
- If you are looking for the y vector, we use $v_y = v \sin \theta$
- If you are looking for the angle of a vector, we can use the equation $\theta = \tan^{-1} (y/x)$

Practice

- A hiker walks 4.5 km in one direction, then makes a 45^{o} turn to the right and walks another 6.4 km. What is the magnitude of her displacement?
- 10 km

Practice

- Sudhir walks 0.40 km in a direction 60.0º west of north, then goes 0.50 km due west. What is his displacement and angle?
- 0.87 km at 77º west of north.

Summary

- Vectors can be determined by finding the angles or finding the axis.
- This can be done through cos, sin, and tan.

Assignment

- Vector Assignment