

Chapter 1 Linear Motion

Example Problems

2.2 Vector Components

E1. A monkey throws a spear with an initial velocity of 30 m/s at an angle of 34° to the ground? What are the vertical and horizontal components of the spear's velocity?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

$v_x =$

$v_y =$

$\theta =$

a) _____ ← units b) _____ ← units

E2. Robbie Knievel is about to make another world record distance jump. His motorcycle leaves the jump ramp at 45 m/s. The ramp has an angle of 22° to the horizontal. What are the vertical and horizontal components of Robbie's velocity off the ramp?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

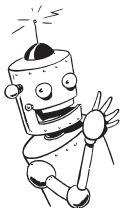
$v_x =$

$v_y =$

$\theta =$

a) _____ ← units b) _____ ← units

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E3. A monkey is mowing his back yard with a push mower. The monkey pushes downward on the handle with a force of 20.0 N at an angle of 30.0° to the horizontal. What are the horizontal and vertical components of the force exerted by the monkey?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F =$

$F_x =$

$F_y =$

$\theta =$

a) _____ ← units b) _____ ← units

E4. A monkey pulls a wagon with a force of 65 N at an angle of 50.0° to the vertical. Calculate the horizontal and vertical components of the force exerted by the monkey?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F =$

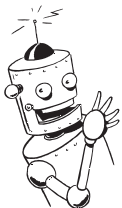
$F_x =$

$F_y =$

$\theta =$

a) _____ ← units b) _____ ← units

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E5. A weather station releases a balloon that rises at a constant 15 m/s relative to the air, but there is a wind blowing at 6.5 m/s toward the west. What are the magnitude and direction of the velocity of the balloon?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

$v_x =$

$v_y =$

$\theta =$

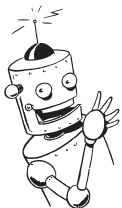
a) _____ ← units b) _____ ← units

E6. You are piloting a small plane, and you want to reach an airport 450 km due south in 3.0 hours. A wind is blowing from the west at 50.0 km/h. What heading and airspeed should you choose to reach your destination in time?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a) _____ ← units b) _____ ← units

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Student Problems

2.2 Vector Components

1. A monkey hits golf ball with a velocity of 66.2 m/s at an angle 30° to the horizontal. Calculate the horizontal and vertical components of the golf balls velocity.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

$v_x =$

$v_y =$

$\theta =$

a) _____ ← units b) _____ ← units

2. A monkey dives off the springboard bounces up into the air with a velocity of 8.0 m/s at an angle of 60° to the horizontal. Calculate the horizontal and vertical components of the monkey’s velocity off the springboard.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

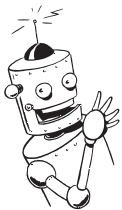
$v_x =$

$v_y =$

$\theta =$

a) _____ ← units b) _____ ← units

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3. A baseball player hits a ball with a velocity of 60 m/s at an angle of 20° to the vertical. Calculate the vertical and horizontal components of the ball's velocity off the bat.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

$v_x =$

$v_y =$

$\theta =$

a) _____ ← units b) _____ ← units

4. Waldo Walenda, one of The Flying Walenda's, was swinging on a trapeze. He let go of the trapeze when it was traveling 20.0 m/s at a 40.0° angle with the vertical. What are the vertical and horizontal components of Waldo's velocity as he leaves the trapeze.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$v =$

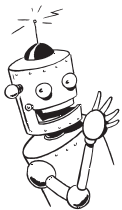
$v_x =$

$v_y =$

$\theta =$

a) _____ ← units b) _____ ← units

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5. A monkey shovels snow after a storm by exerting a force of 30.0 N on her shovel at an angle of 60.0° to the horizontal. What are the horizontal and vertical components of the force exerted by the monkey?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F =$

$F_x =$

$F_y =$

$\theta =$

a) _____ ← units b) _____ ← units

6. A gorilla pulls a sled loaded with logs to his cabin in the woods. If the gorilla pulls with a force of 800 N in a direction 20.0° to the horizontal. Calculate the horizontal and vertical components of the force exerted by the gorilla on the sled.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F =$

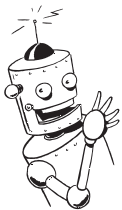
$F_x =$

$F_y =$

$\theta =$

a) _____ ← units b) _____ ← units

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Name _____ Period _____ Date _____

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