

## Skill and Practice Sheet Answers

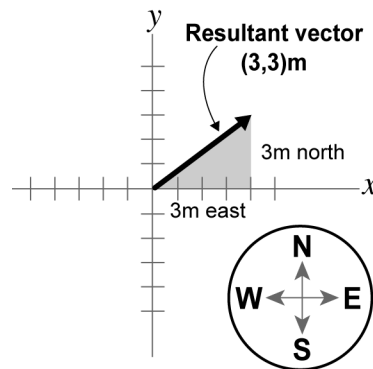
## 6A Adding Displacement Vectors

## Practice set 1:

- The total displacement is 5 meters east and 5 meters north.
- The total displacement is 2 meters east and 2 meters south.
- The total displacement is zero. Total distance traveled is 40 meters.

## Practice set 2:

- $\vec{x}_R = (1, -5)\text{m}$
- $\vec{x}_R = (3, 3)\text{m}$ ; diagram at right:
- $\vec{x}_R = (5, 5)\text{m}$
- $\vec{x}_R = (6, 2)\text{m}$
- $\vec{x}_R = (2, 0)\text{m}$



## 6B Projectile Motion

- Answers are:
  - horizontal and vertical distance
  - horizontal speed
  - $d_x = v_x t$ ;  $d_y = 4.9t^2$
  - 6.4 m/s
- Answers are:
  - horizontal speed, time
  - vertical distance, horizontal distance
  - $d_y = 4.9t^2$ ;  $d_x = v_x t$
  - height = 44.1 meters, horizontal distance = 30 meters
- Answers are:
  - vertical distance
  - time
  - $d_y = 4.9t^2$
  - 1.4 seconds
- Answers are:
  - horizontal and vertical distance
  - horizontal speed
  - $d_x = v_x t$ ;  $d_y = 4.9t^2$
  - 59 m/s
- Answers are:
  - horizontal speed, time
  - vertical distance
  - $d_y = 4.9t^2$
  - 2.8 meters
- Answers are:
  - horizontal speed, vertical distance
  - time
  - $d_y = 4.9t^2$
  - 0.45 seconds
- Answers are:
  - height of bridge, time
  - height of person
  - bridge height - vertical distance marshmallow travels = person's height;  $d_y = 4.9t^2$
  - marshmallow travels 3.38 meters; person's height = 1.62 meters

### 6C Circular Motion

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1. Answers are:
  - a.  $1,188^\circ/\text{second}$
  - b. 200 rpm
2. Answers are:
  - a. 0.38 meter
  - b. 1.52 m/s
  - c. 0.75 m/s
3. Slower. A cd rotates at about 500 rpm when the head reads the inner edge and 200 rpm when the head reads the outer edge.
4. Answers are:
  - a. 0.96 meter
  - b. 2.15 meter
  - c. 1,042 revs
  - d. 465 revs

### 6D Universal Gravitation

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1.  $F = 9.34 \times 10^{-6}$  N. This is basically the force between you and your car when you are at the door.
2.  $5.27 \times 10^{-10}$  N
3. 4.42 N
4.  $7.36 \times 10^{22}$  kilograms
5. Answers are:
  - a.  $9.8 \text{ N/kg} = 9.8 \text{ kg}\cdot\text{m/s}^2\text{-kg} = 9.8 \text{ m/s}^2$
  - b. Acceleration due to the force of gravity of Earth.
  - c. Earth's mass and radius.
6.  $1.99 \times 10^{20}$  N
7. 4,848 N
8.  $3.52 \times 10^{22}$  N