

8-7

NAME _____ DATE _____ PERIOD _____

Practice

Modeling Motion Using Parametric Equations

Find the initial horizontal and vertical velocity for each situation.

1. a soccer ball kicked with an initial velocity of 39 feet per second at an angle of 44° with the ground

28.05 ft/s, 27.09 ft/s

2. a toy rocket launched from level ground with an initial velocity of 63 feet per second at an angle of 84° with the horizontal

6.59 ft/s, 62.65 ft/s

3. a football thrown at a velocity of 10 yards per second at an angle of 58° with the ground

5.30 yd/s, 8.48 yd/s

4. a golf ball hit with an initial velocity of 102 feet per second at an angle of 67° with the horizontal

39.85 ft/s, 93.89 ft/s

5. **Model Rocketry** Manuel launches a toy rocket from ground level with an initial velocity of 80 feet per second at an angle of 80° with the horizontal.

- a. Write parametric equations to represent the path of the rocket.

$x = 80t \cos 80^\circ; y = 80t \sin 80^\circ - 16t^2$

- b. How long will it take the rocket to travel 10 feet horizontally from its starting point? What will be its vertical distance at that point?

0.72 s; 48.43 ft

6. **Sports** Jessica throws a javelin from a height of 5 feet with an initial velocity of 65 feet per second at an angle of 45° with the ground.

- a. Write parametric equations to represent the path of the javelin.

$x = 65t \cos 45^\circ; y = 65t \sin 45^\circ - 16t^2 + 5$

- b. After 0.5 seconds, how far has the javelin traveled horizontally and vertically?

22.98 ft; 23.98 ft