

Section

2-3

HOLT PHYSICS

Math Skills*Falling Objects*

A juggler throws a ball straight up into the air. The ball remains in the air for a time Δt before it lands back in the juggler's hand.

$$\Delta y = v_i (\Delta t) + \frac{1}{2}a(\Delta t)^2$$

$$v_f = v_i + a(\Delta t)$$

$$v_f^2 = v_i^2 + 2a\Delta y$$

1. Answer the following questions in terms of Δt and g .

- a. What is the acceleration of the ball during the entire time the ball is in the air?

- b. With what speed did the juggler throw the ball into the air? (Hint: What is the total displacement of the ball during the time it is in the air?)

- c. How much time elapsed before the ball reached its maximum height?

- d. How high above the point of release did the ball rise?

2. Assume that the ball was in the air for 2.4 s. Answer the following questions:

- a. What is the acceleration of the ball during the entire time the ball is in the air?

- b. With what speed did the juggler throw the ball into the air?

- c. How much time elapsed before the ball reached its maximum height?
