History Connection

One of the scientists who first described motion quantitatively was Galileo Galilei. Galileo was born in Italy in 1564 and lived until 1642. Ask students to use the library or the Internet to find out what famous English writer was born the same year as Galileo. (William Shakespeare) Ask them to speculate and conduct research to find out about what historical and political forces in Europe at that time might have encouraged both the sciences and the humanities. LS Verbal

Math Skills

Answers to Practice

1. $\frac{4.0\text{ m/s} - 0\text{ m/s}}{2.5\text{ s}} = 1.6\text{ m/s}^2$ along her path
2. $\frac{0.80\text{ m/s} - 0.50\text{ m/s}}{4.0\text{ s}} = 0.075\text{ m/s}^2$ toward the shore
3. $\frac{9.6\text{ m/s} - 12\text{ m/s}}{0.8\text{ s}} = -3\text{ m/s}^2$ north $= 3\text{ m/s}^2$ south
4. $t = \frac{\Delta v}{a} = \frac{26.8\text{ m/s} - 24.6\text{ m/s}}{2.6\text{ m/s}^2} = 0.85\text{ s}$
5. $v_f = v_i + at = 4.5\text{ m/s} + (2.3\text{ m/s}^2 \times 5.0\text{ s}) = 16\text{ m/s}$

Additional Examples

[redacted]

LS Logical

Practice Hint

- When a problem asks you to calculate acceleration, you can use the acceleration equation.

$$a = \frac{\Delta v}{t}$$

To solve for other variables, rearrange it as follows.

- Problem 4: To isolate t, first multiply both sides by t.

$$a \times t = \frac{\Delta v}{t} \times t$$

$$\Delta v = at$$

Next, divide both sides by a.

$$\frac{\Delta v}{a} = \frac{at}{a}$$

$$t = \frac{\Delta v}{a}$$

- Problem 5: Rearrange the acceleration equation to isolate final velocity.

$$v_f = v_i + at$$

es of matter and about conditions in the rly universe.
ne of this theoretical research has practi- plications as well. For example, Magnetic ance Imaging (MRI) is a technique used dicine to image the inside of the human The powerful superconducting magnets n MRI technology were first developed in 70s for Fermilab's Tevatron. Have students ch particle accelerators or MRI technology ake a poster to show what they learned.
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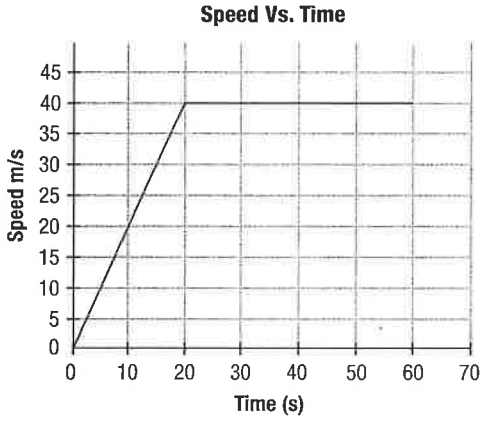
Continuation of Answers

Answers from p. 376

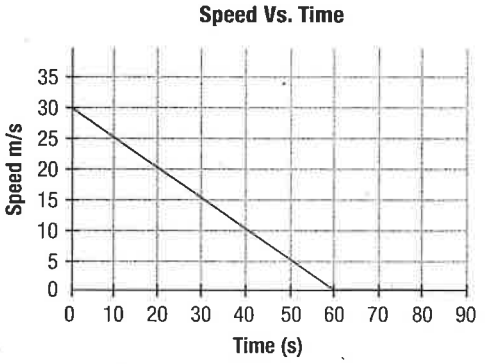
Answers to Practice

1. Sample graph:



20 m/s; 40 m/s

2. Sample graph:



-0.5 m/s^2

Answers continued from p. 377

4. He is accelerating both when he is going in circles at the same rate of speed and when he is increasing speed. One involves a change in direction, while the other involves a change in speed. Both speed and direction are a part of velocity, and any change of velocity is acceleration.
5. $v_f = v_i + at = 0 + (2.0\text{ m/s}^2)(3.5\text{ s}) = 7.0\text{ m/s}$
6. 2.5 m/s^2 is the acceleration. The graph should be a straight line from 7.0 m/s at the 0 s line of time to 12 m/s at the 2.0 s line of time (with time on the horizontal axis and speed on the vertical axis).

Answers continued from p. 385

7. If there is no acceleration, the net force is zero. The force of static friction is equal to, but in the opposite direction of the force pulling the truck downhill: 2,000 N uphill.