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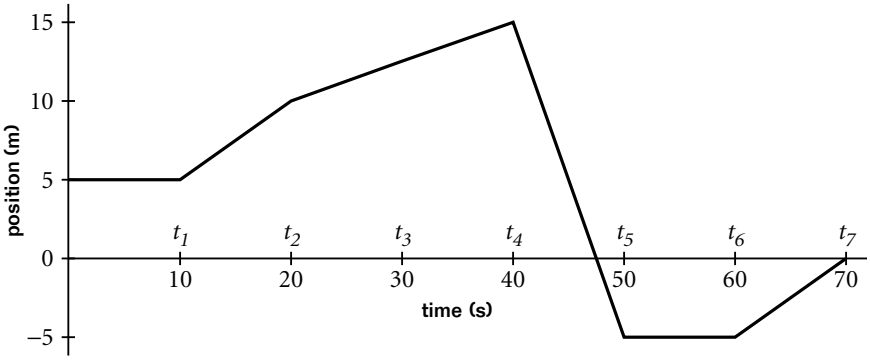
Section 2-1

HOLT PHYSICS

Graph Skills

Displacement and Velocity

A minivan travels along a straight road. It initially starts moving toward the east. Below is the position-time graph of the minivan. Use the information in the graph to answer the questions.



1. Does the minivan move to the east? If so, during which time interval(s)?

_____

2. Does the minivan move to the west? If so, during which time interval(s)?

_____

3. Is the minivan's speed between t_1 and t_2 greater than, less than, or equal to its speed between t_2 and t_3?

_____

4. Is the minivan's speed between t_4 and t_5 greater than, less than, or equal to its speed between t_6 and t_7?

_____

5. Does the minivan ever stop completely? If so, at which time(s)?

_____

6. Does the minivan ever move with a constant velocity? If so, at which time(s)?

_____

7. What is the total displacement of the minivan during the trip?

_____

DATE _____ CLASS _____

Section 2-2

HOLT PHYSICS

Math Skills

Acceleration

A car is traveling down a straight road. The driver then applies the brake, and the car decelerates with a constant acceleration until it stops. Refer to the equations below to answer the questions.

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

1. What is the car's final speed v_f? Explain your answer.

2. You are given the distance the car travels and the length of time it takes for the car to come to a complete stop after the driver applies the brakes. What is the expression for the car's initial speed?

3. You are given the car's initial speed and the length of time it takes for the car to come to a full stop after the driver applies the brakes. What is the expression for the magnitude of the car's acceleration?

4. You are given the car's initial speed and the distance the car travels before it comes to a complete stop after the driver applies the brakes. What is the expression for the magnitude of the car's acceleration?

5. You are given the magnitude of the car's acceleration and the length of time it takes for the car to come to a full stop after the driver applies the brakes. What is the expression for the initial speed of the car, and what is the expression for the distance it traveled before it came to a complete stop?

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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.

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

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?

_____

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Chapter 2

HOLT PHYSICS

Mixed Review

Motion in One Dimension

1. During a relay race along a straight road, the first runner on a three-person team runs d_1 with a constant velocity v_1. The runner then hands off the baton to the second runner, who runs d_2 with a constant velocity v_2. The baton is then passed to the third runner, who completes the race by traveling d_3 with a constant velocity v_3.

a. In terms of d and v, find the time it takes for each runner to complete a segment of the race.

Runner 1 _____ Runner 2 _____ Runner 3 _____

b. What is the total distance of the race course?

_____

c. What is the total time it takes the team to complete the race?

_____

2. The equations below include the equations for straight-line motion. For each of the following problems, indicate which equation or equations you would use to solve the problem, but do not actually perform the calculations.

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

a. During takeoff, a plane accelerates at 4 m/s^2 and takes 40 s to reach takeoff speed. What is the velocity of the plane at takeoff?

_____

b. A car with an initial speed of 31.4 km/h accelerates at a uniform rate of 1.2 m/s^2 for 1.3 s. What is the final speed and displacement of the car during this time?

_____

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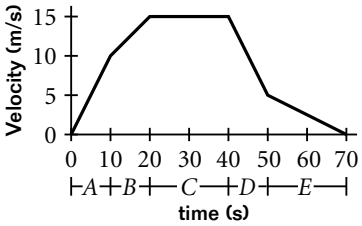
Chapter 2

HOLT PHYSICS

Mixed Review *continued*

3. Below is the velocity-time graph of an object moving along a straight path. Use the information in the graph to fill in the table below.



For each of the lettered intervals below, indicate the motion of the object (whether it is speeding up, slowing down, or at rest), the direction of the velocity (+, –, or 0), and the direction of the acceleration (+, –, or 0).

Time interval	Motion	v	a
A			
B			
C			
D			
E			

4. A ball is thrown upward with an initial velocity of 9.8 m/s from the top of a building.

a. Fill in the table below showing the ball's position, velocity, and acceleration at the end of each of the first 4 s of motion.

Time (s)	Position (m)	Velocity (m/s)	Acceleration (m/s^2)
1			
2			
3			
4			

b. In which second does the ball reach the top of its flight?

_____

c. In which second does the ball reach the level of the roof, on the way down?

_____