

Use with textbook pages 344-347.

Scalars versus vectors

1. Define the following terms.

- a) scalar quantity that has magnitude but not direction.
 b) vector quantity that has both magnitude + direction.
 c) magnitude size of a measurement or amount.
 d) reference point point from which change is measured.

2. Complete the following table.

Quantity	Symbol	SI Unit	Scalar or Vector
time	t	s	scalar
time interval	Δt	s	scalar
distance	d	m	scalar
position	\vec{r}	m	vector
displacement	$\Delta \vec{d}$	m	vector.

3. Identify whether the statement is describing a scalar or a vector. Place an "S" for scalar and a "V" for vector in the space provided.

- a) V A squirrel runs 7 m east of a tree.
 b) S The school is 5 km from the airport.
 c) S It took the class 30 minutes to complete the motion lab.
 d) V A little girl pulls her wagon 10 m west of the tree house.

4. Indicate whether the direction is positive (+) or negative (-).

a) Positive

→ right

b) Neg

← west

c) Positive

north



d) Neg



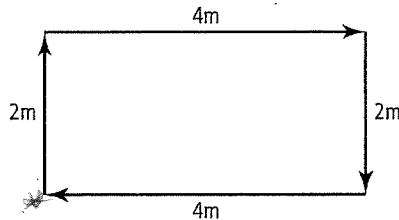
Use with textbook pages 346–349.

Distance, position, and displacement

1. Complete the following table by filling in the blank boxes. In the last column of the table, circle the appropriate word from each pair.

t_i (s)	t_f (s)	Δt (s)	d_i (m)	d_f (m)	Δd_i (m)	Direction of Motion
6.0	7.5	1.5	+18.4	+22.6	+4.2	left/right
5.7	8.5	2.8	+24.3	+30.1	+5.8	up/down
20.2	38.4	18.2	+39.1	+24.8	-14.3	north/south
12.4	18.8	6.4	+54.8	+46.2	-8.6	east/west

2. Use the following diagram to answer the questions below.



A girl walks 2 m [N], 4 m [E], 2 m [S] and then 4 m [W].

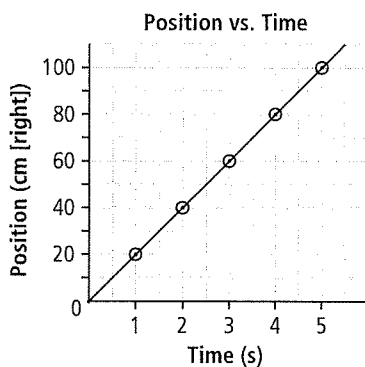
- a) What is the total distance the girl travelled? 12m
- b) What is the displacement of the girl? 0m

Use with textbook page 353–354.

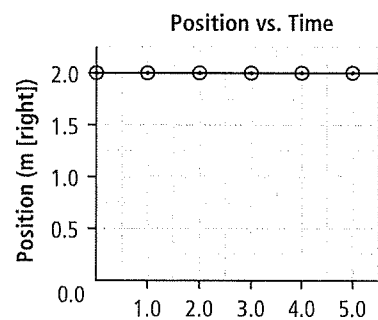
Positive, negative, and zero slopes

Use the following position-time graphs to answer the questions below.

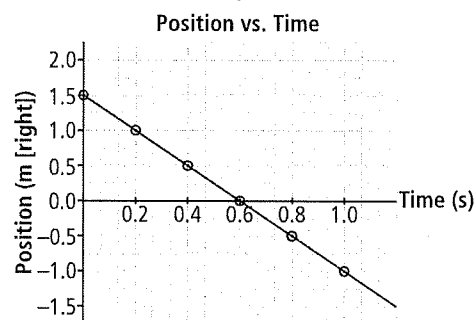
Graph A



Graph B



Graph C



Match the Description below with the corresponding Graph shown above. Each Graph can be used as often as necessary. Write the correct letter in the space provided.

1. B a line with a zero slope
2. A a line with a positive slope
3. C a line with a negative slope
4. A B C a line that represents uniform motion
5. B the motion of an object at rest (not moving)
6. C the motion of an object moving to the left of the reference point
7. A the motion of an object moving to the right of the reference point

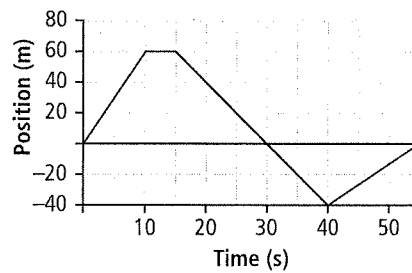
Use with textbook page 350.

Uniform motion

1. Identify each of the situations below as either uniform motion or non-uniform motion.

- a) a snowball rolls down a hill non-uniform
- b) a man sits on bench watching pigeons uniform motion
- c) a woman walks through a crowded mall during the Christmas season
non-uniform motion

Use the following position-time graph showing the motion of an object, initially moving to the right, to answer the questions below 2 to 4.



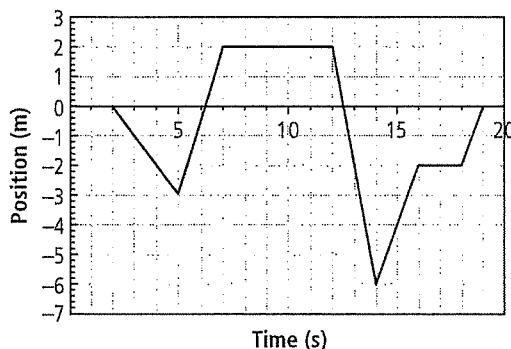
2. For each time interval, describe the slope of the line (positive, negative, or zero) and the motion of the object.

Time Interval	Slope of Line	Description of Motion
0 s–10 s	positive	The object is moving to the right of the origin with uniform motion.
10 s–15 s	zero	object at rest.
15 s–30 s	negative	object is moving back to origin w/ uniform motion
30 s–40 s	negative	moving to left of origin w/ uniform motion
40 s–55 s	positive	moving toward origin w/ uniform motion.

3. During which time interval did the object travel the shortest distance? 10-15s

4. During which time interval did the object travel the longest distance? 15-30s

A student is waiting at a bus stop and starts to pace back and forth. Use the following position-time graph showing the student's motion to answer questions 5 to 11.



5. During which time intervals is the student standing still?
0-2s and 7-12sec
6. Describe the motion of the student during the time interval 2 s to 5 s.
pacing backward away from bus stop
7. Describe the motion of the student during the time interval 14 s to 16 s.
pacing forward toward bus stop
8. What is the student's position at 7 s? 2 m in front of bus stop.
9. What is the student's displacement between 12 s and 14 s? -8 m (8 m backward)
10. What is the total distance covered by the student during the first 16 s? 20 m
11. What is the student's displacement during the time interval 0 s to 20 s? 0 m

