Chapter 2 Review

Name: _____

Displacement & Velocity Concepts

1) Is displacement a vector or a scalar?

Displacement is a vector that show how far from the origin and in the direction.

2) Is average velocity a vector or a scalar?

Average velocity is a vector because it also shows direction as well as magnitude.

3) A physics book is moving across a table. Can that book

a) have a constant speed and a changing velocity?

Yes, if speed is constant but it is changing direction, then the velocity will change because of the change of direction.

b) have a constant velocity and a changing speed?

No, if velocity changes, then speed also has to change because it is the magnitude of the velocity.

4) If the average velocity of a particle is zero in some time interval, give two explanations about the particle's displacement in that time period. Either the particle is not moving, or it moved from the origin away in a positive direction and then back to the origin in the negative direction.

Graphing Motion

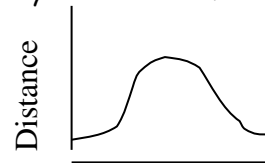5) For each of the following position vs. time graphs, explain how you would walk.
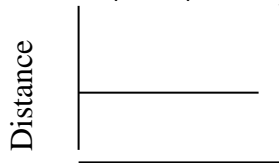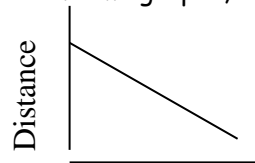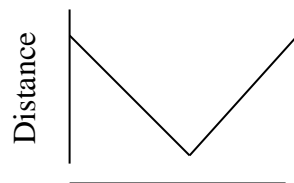

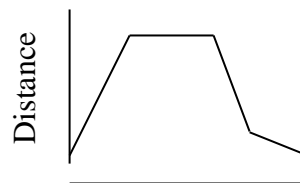a   Time   b   Time   c   Time

d   Time   e   Time

a) Standing still, not moving.
b) Walking at a constant speed in a negative direction
c) Speeding up in a positive direction, then slowing down and coming to a stop, turning around, then speeding up in a negative direction and then slow down.
d) Walking at a constant speed in a negative direction, and then quickly turning around an walking back in a positive direction at a constant speed.
e) Walking at a constant speed in a positive direction, stopping for a period of time, walking back in a negative direction at a constant speed, then slowing to a slower constant speed in a negative direction.

6) Sketch a distance vs. time graph corresponding to each of the following descriptions of motion:
a) the object moves with a constant velocity away from the origin.
b) the object moves away from the origin with a steady velocity for 5 s, and then stands still for 5 s.
c) the object moves away from the origin, starting quickly, then slowing down.

Distance   Time

Distance   time

Distance   time
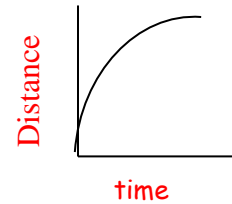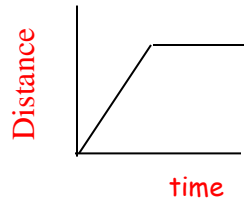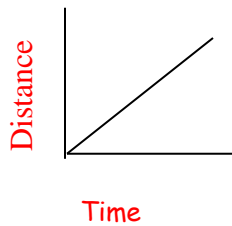
Distance & Speed Problems

7) While John is traveling west down I-70, he notices while in Columbus he is at mile marker 105. In Dayton, John passes mile-marker 32.
    a) What is the distance between the two towns? 73 miles
    b) What is John's position compared to his initial position? 73 miles west
    c) What is the displacement vector for his trip? 73 miles west

8) A physics textbook is moved once around the perimeter of a table that measures 3.50 m by 0.75 m.
    a) If the book ends up in its initial position, what is the book's displacement? 0.00 m
    b) What is the distance traveled? 8.50 m

9) Light from the Sun reaches Earth in 8.3 min. The speed of light is 3.00×10^8 m/s. How far is the Earth from the Sun? 1.49×10^{11} m

10) You plan a trip on which you want to average 100 km/hr. You cover the first third of the distance at an average speed of only 72 km/hr. What must your average speed for the last 2/3 of the trip be in order to meet your goal? 114 km/hr

16) Twins Will and Tom are trying to become conjoined twins. They figure if they run at one another fast enough, this process will happen. They start 112 m apart and run toward one another, Will running at 3.4 m/s and Tom running at 2.8 m/s. If they start at the same time, where and when will they collide?
 In 18.1 s at a distance of 61.5 m from where Will started (50.5 m for Tom)