

Name: \_\_\_\_\_

Date \_\_\_\_\_

Work Sheets following Lesson 6, Lesson 7, and Lesson 9

/30

Assignment 3

Velocity, Acceleration, Newton's laws

1. Interpret this graph and fill in the missing information below! (6)

(a)  $t_i$  \_\_\_\_\_

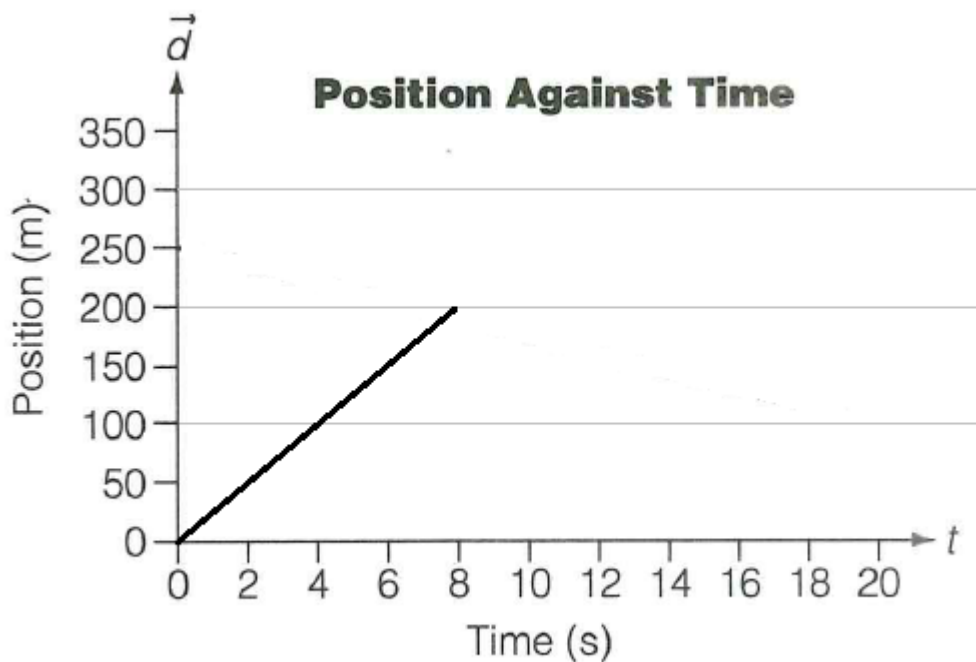
(b)  $t_f$  \_\_\_\_\_

(c)  $\Delta t$  \_\_\_\_\_

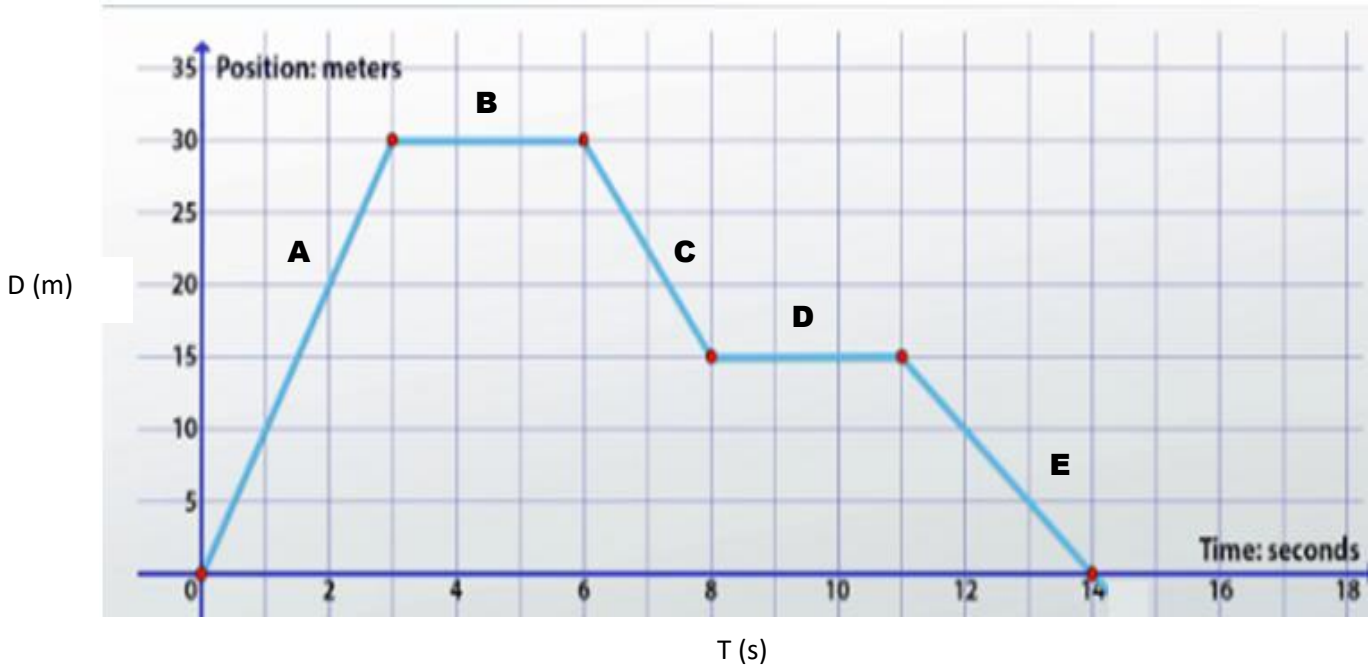
(d)  $\vec{d}_i$  \_\_\_\_\_

(e)  $\vec{d}_f$  \_\_\_\_\_

(f)  $\vec{\Delta d}$  \_\_\_\_\_



## Distance -Time Graph (Calculate Velocity!)



2. Calculate the Velocity for Slope "A", "B", "C", "D", and "E" on the above graph. (6)

Remember  $\vec{V} = \frac{\Delta d}{\Delta t}$

Slope A:  
 $\vec{V} = \frac{d_2 - d_1}{t_2 - t_1} = \frac{-}{-} = \underline{\hspace{2cm}} = \text{m/s}$

Slope B:

Slope C:

Slope D:

Slope E:

Is there a slope on "B" and "D"? Yes or No? Is there motion: yes or no?

3. Calculate acceleration for the following questions.

Remember

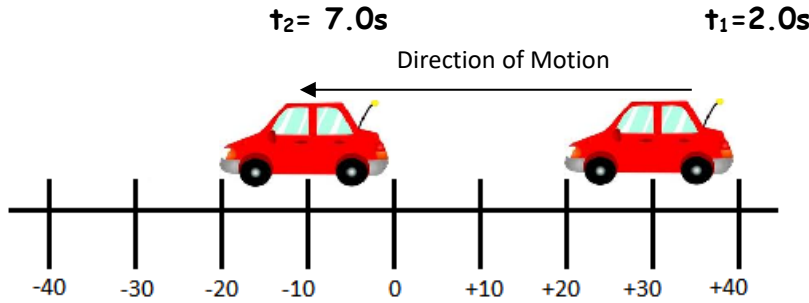
$$a = \frac{\Delta v}{\Delta t}$$

**A:** A race car accelerates uniformly from 18.5 m/s to 46.1 m/s in 2.47 seconds. Determine the acceleration of the car. (1)

**B:** An airplane accelerates down a runway. At 20 seconds of acceleration, the plane is moving at 3.20 m/s<sup>2</sup>. At 55 seconds the plane is moving at 48m/s<sup>2</sup> and finally lifts off the ground. Determine the acceleration. (1)

**C:** A Helicopter lifts off vertically. It begins moving horizontally to the west at 28.8 km/h which is 8 m/s. After 2 minutes (120seconds) of flight the helicopter has increased its velocity to 120 km/h which is 33.33m/s. What is the acceleration? (1)

4. Answer the following questions using this diagram of motion. (Use the front bumper for measurement)



a. Find the information that corresponds to the symbol:  $d_1$  (1)

b. Find the information that corresponds to the symbol:  $d_2$  (1)

c. Find  $\Delta t$  and then  $\Delta d$  (1)

d. Find the velocity in m/s (1)

5. Which scientist made these following statements?

a) The speed of falling objects depends on their mass (weight). (1)

b) Objects of different masses, when dropped at the same time fall at the same speed, thus hitting the ground at the same time. (1)

c) Objects move or stay at rest because that is what they want to do. (1)

6. Which scientist that studied the theory of motion described that "objects fall at the same speed regardless of their mass with all friction removed". (1)

7. Answer the following questions on newtons laws: (3)

a) Which law of newton states that for every action there is an equal and opposite reaction.

b) Which law of newton states the greater the mass the slower the acceleration?

c) Which law of newton states that an object at rest stays at rest?

8. Which of Newtons three laws states: (4)

a) This law is also often called the "Law of Inertia".

b) This law is often expressed as an equation  $F = M \times A$ .

c) This law of newton speaks about equal and opposite forces.

d) Stationary objects are held in place by equal, opposing forces.