Chapter 4 Review Sheet
Integrated Science – Physics & Engineering Design

Name_____Period_____

1. Define the following terms:
   a. Speed

      How quickly something moves

   b. Velocity

      speed + direction of object

   c. Acceleration

      Rate of change of velocity

   d. Vector quantity

      variable that has both size + direction

   e. Free fall

      Gravity is only force acting on object

   f. Strong relationship between variables

      A large change in 1 variable causes a large change in other var.

   g. Weak relationship between variables

      A large change in 1 variable causes a small change in other var.

2. What is the difference between average speed and instantaneous speed?

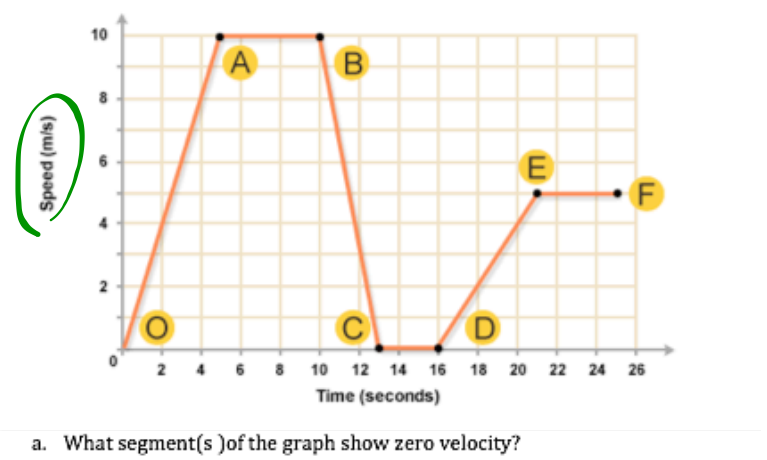
   Ave. speed = total dist. / total time

   Inst. speed = meas. velocity @ 1 instant

3. What is the difference between speed and velocity?

Velocity has direction

4. Refer to Figure 1:



a. What segment(s)of the graph show zero velocity?

C - D

b. What segment(s) of the graph show zero acceleration?

A-B + E-F + C-D

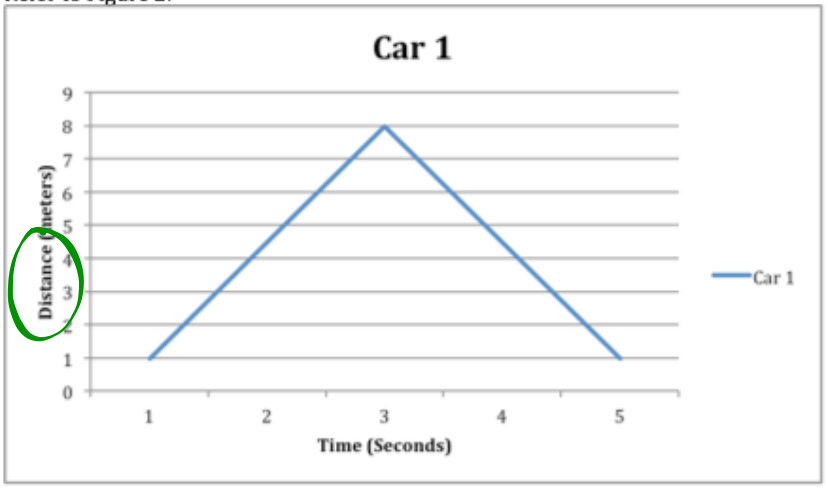
c. What segment(s) of the graph show negative acceleration?

B - C

d. What segment(s) of the graph show positive acceleration?

O-A + D-E

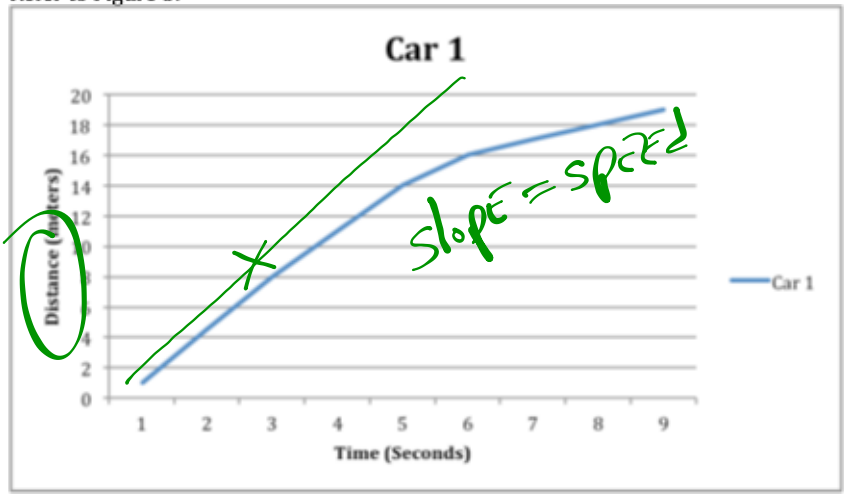
5. Refer to Figure 2:



a. Is the car accelerating? Why or why not?

YES — CHANGING DIRECTION

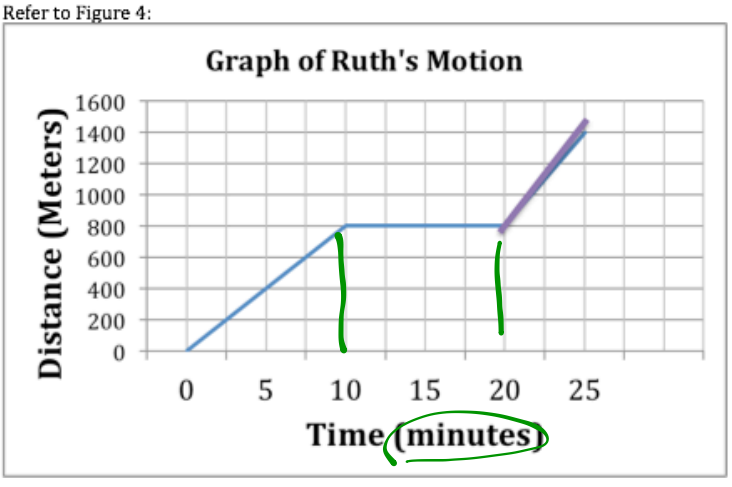
6. Refer to Figure 3:



a. Is the car accelerating? Why or why not?

YES – slowing Down

7. Refer to Figure 4:



a. Is Ruth traveling at a constant velocity? Why or why not?

NO – SPEED changes over 25 min.

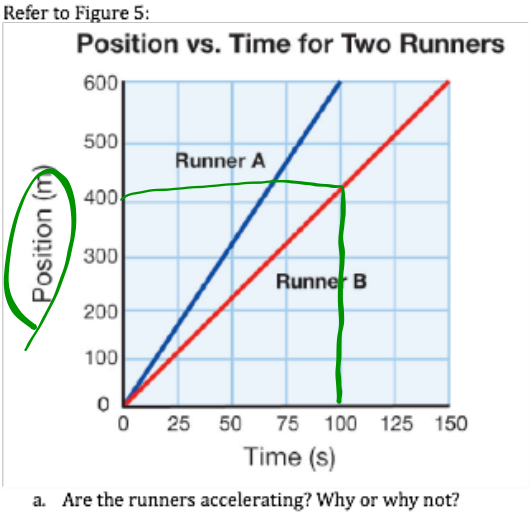
b. What is indicated about Ruth's motion between 10 and 20 ~~seconds?~~ min

stopped

c. During what time is Ruth moving the fastest?

20-25 min – steepest

8. Refer to Figure 5:



a. Are the runners accelerating? Why or why not?

NO – straight lines = const. speed

b. Which runner is moving fastest? How do you know?

A = steeper slope

c. How far has each runner gone in 100 seconds?

A = 600 m B ≈ 400 m

For each problem below, carry out these steps:

- Write the **formula** that you will use to solve the problem
- Re-write the formula, substituting known values **with units**
- Write the answer using the proper **unit**
- Check you answer for the proper number of **significant figures**
- Check you work for accuracy

9. A bicyclist travels 30.0 km in 1.8 hours. What is the cyclist's average speed?

$$s = d/t = \frac{30.0\ km}{1.8\ hr} = 17\ km/hr$$

10. How much time would it take for the sound of thunder to travel 3,000 meters if sound travels at a speed of 330 m/s?

$$t = d/s = \frac{3{,}000\ m}{330\ m/s} = 9\ sec.$$

11. A snail moves about 0.25 meters per minute. How many meters can the snail cover in 35 min?

$$d = s \times t = 0.25\ m/min \times 35\ min = 8.8\ m.$$

12. A motorcycle slows from 100 m/s to 10 m/s in 5 seconds. What is the acceleration of the motorcycle?

$$a = \frac{v_f - v_i}{t} = \frac{10\ m/s - 100\ m/s}{5s} = \frac{-90\ m/s}{5s} = -20\ m/s/s$$

13. A jet starts at rest and after 10 seconds is moving at 400 m/s. What is the acceleration of the jet?

$$a = \frac{v_f - v_i}{t} = \frac{400\ m/s - 0\ m/s}{10\ s}$$

$$= 40\ m/s/s$$