**Kinematics with Graphs**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_Period: \_\_\_\_\_\_\_\_\_

**SUMMARY**

The slope of this segment gives the average velocity between a and b.



***FACTS TO REMEMBER***

Theslope of a **position vs. time** graph gives **VELOCITY**.

Theslope of a **velocity vs. time** graph gives **ACCELERATION**.

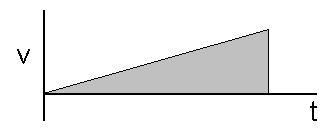
The area under a **velocity vs. time** graph gives **DISPLACEMENT**.

The area under an **acceleration vs. time** graph gives **VELOCITY**.

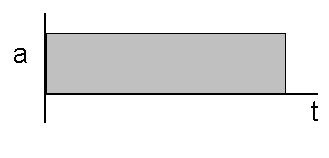
**SLOPE= =**

The slope of this tangent gives the instantaneous velocity at point c.

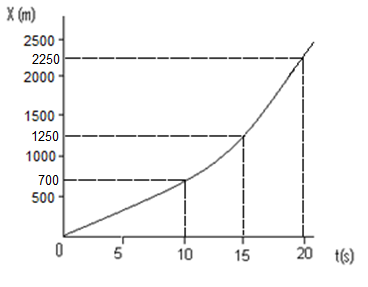
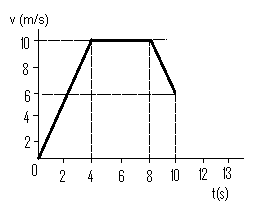
The slope of this segment gives average acceleration.

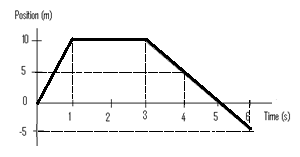


This area represents the displacement



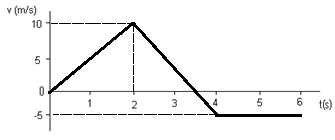
This area represents the change in velocity.

1. Use figure 1 (on the right) to calculate the following:
   1. What is the average velocity from 0 to 10 seconds?
   2. What is the average velocity from 10 to 20 seconds?
   3. What is the average velocity from 0 to 20 seconds?
   4. What is the instantaneous speed at 15 seconds?
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. The velocity of a baseball player running towards a ball is shown in the following figure.
   1. Find instantaneous acceleration at 3 seconds
   2. Find instantaneous acceleration at 6 seconds
   3. Find instantaneous acceleration at 9 seconds
   4. Find the displacement for the first 4 seconds
   5. Find the displacement for the first 10 seconds.
   6. What was the displacement between 8-10 seconds?
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. Use the following figure to answer the following questions.



* 1. Find the average velocity from 0 to 1 second

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Find the instantaneous velocity at 2 seconds
   2. Find the instantaneous velocity at 5 seconds
   3. Find the acceleration at 4 seconds
5. Use the following figure to calculate the following.



* 1. What is the velocity at 0s?
  2. Find the acceleration for the first 2 seconds
  3. What is the acceleration from t=2s to t=3.5s?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. What is the acceleration from t=3.5s to t=6s?
   2. How far did the object travel from t=4s to t=6s?
   3. How far did the object travel from t=0s to t=3s?

