# Motion Review Name \_\_\_\_\_\_\_\_\_\_KEY\_\_\_\_\_\_\_\_\_\_

1. The following graph shows the position vs. time for a student.

Displacement

0

D

C

B

Time

A

1. What does the slope of a position vs. time graph tell you? \_\_\_\_\_\_velocity\_\_\_\_\_\_\_\_\_
2. Describe the displacement of the student throughout the motion.  
     
   0-A 🡪 motion at constant speed in positive direction

A-B 🡪 stationary

B-C 🡪 motion at constant speed in negative direction  
C-D 🡪 accelerating in positive direction

1. Describe the velocity of the student throughout the motion.  
     
   0-A 🡪 constant velocity in positive directions

A-B 🡪 0

B-C 🡪 constant velocity in negative direction  
C-D 🡪 accelerating in positive direction

1. When is the student standing still? \_\_\_\_A-B\_\_\_\_\_\_\_
2. When is the student walking in the positive direction? \_\_\_\_\_\_\_0-A, C-D\_\_\_\_\_\_
3. When is the student walking in the negative direction? \_\_\_\_\_\_B-C\_\_\_\_\_\_\_\_
4. When is the student’s velocity constant? \_\_\_\_\_0-A, B-C\_\_\_\_\_\_\_
5. When is the student accelerating? \_\_\_\_\_\_\_C-D\_\_\_\_\_\_\_  
    Is the acceleration positive or negative? Positive (increasing in speed)
6. Create a graph of the velocity vs. time for the motion.

0

B

C

D

A

Velocity

Time

1. The following graph shows a student’s velocity vs. time. Answer the questions based on the graph.

Velocity

Time

E

D

C

B

0

A

1. What does the slope of a velocity vs. time graph tell you? \_\_\_\_\_\_\_\_acceleration\_\_\_\_\_\_\_\_
2. What does the area underneath a velocity vs. time graph tell you? \_\_\_represents distance travelled\_\_\_\_\_\_\_\_\_\_
3. Describe the velocity of this student throughout the motion. Give the direction of the velocity and tell whether the velocity is increasing, decreasing, or remaining constant.  
   0-A 🡪 constant acceleration in positive direction

A-B 🡪 slowing down, then change directions and speed up at constant acceleration

B-C 🡪 constant velocity in negative direction  
C-D 🡪 slowing down in negative direction, then speed up in positive direction  
DE🡪constant velocity in positive direction

1. Describe the acceleration of the student throughout the motion. Give the direction of the acceleration and tell whether it is increasing, decreasing, or remaining constant.  
   0-A 🡪 constant acceleration

A-B 🡪 constant negative acceleration

B-C 🡪 0  
C-D 🡪 constant acceleration  
DE🡪0

1. At what times is the student’s velocity zero? \_\_\_\_\_\_never, only at 2 instants\_\_\_\_\_\_\_\_
2. When is the student accelerating? \_\_\_0A, AB, CD\_\_\_\_\_\_\_
3. When is the student walking with constant velocity? \_\_\_BC, DE\_\_\_\_\_\_\_\_
4. When are the student’s velocity positive and the acceleration negative? \_\_\_\_\_\_\_\_\_\_\_
5. Sketch a graph of the position vs. time for the motion above.

Position

Time

0

1. A car travels down the road at a constant velocity. It goes 250 meters in 8.4 seconds. What is the velocity of this car?  
     
   30. m/s (sig figs)
2. A bird flies through the air at 6.8 m/s. How long will it take the bird to fly 80 meters?  
     
   10. s (sig figs)
3. A plane travels at 190 m/s. How far can the plane fly in 15 seconds?  
     
   2900 m (sig figs)
4. A jogger can run at a constant velocity of 4 m/s. A sprinter can run at a constant velocity of 6 m/s. The sprinter gives the jogger a 10 second head start. How long will it take for the sprinter to catch the jogger and how far will they have run from their starting point?  
     
     
   Jogger gets 40 meters ahead (distance = vt). If we consider that velocity is distance/time, the jogger’s distance travelled is y=4x+40 and the sprinter’s speed is y = 6x. Y is distance, X is time. To find when they will intersect, set 6x = 4x+ 40 . Solve for x (time at which they will intersect). X = 20 s.
5. A rock dropped from the top of a building takes 3.4 seconds to reach the ground.

How tall is the building?  
  
d=1/2 at2

57 m (sig figs)

How fast is the rock traveling when it hits the ground?  
vf= at = 33 m/s

1. The punter for the Browns kicks the ball straight up in the air with an initial velocity of 36 m/s.

How long will the ball be in the air?  
  
vf=vi+at

T=3.7 s

What is the maximum height above the ground that the ball will reach before it stops?  
  
18.13 m

1. On the graph below, draw a sketch of the following motion: A student is walking down the hall at a constant velocity of 2 m/s for 2 seconds. She slows down to a stop over 1 second and stands still for 2 seconds. She accelerates to 1 m/s in the opposite direction over 1 second and then runs at that velocity for 3 seconds.

Velocity (m/s)

0

Time (s)

* 1. What is the total displacement of the student from the starting point? (Show all work)
  2. What is the maximum acceleration of the student and when does it occur?