Name: _____

Class: _____

Due Date: _____

Physics Topic 4A - Horizontal Motion in One Dimension

Answer the following questions. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

1. E: A car starts from rest and speeds up to 35.0 m/s in 12.0 s.

   a. What is the average acceleration of the car during these 12.0 s?

   b. What is the total distance traveled by the car during these 12.0 s?

   The car then travels at a constant speed of 35.0 m/s for 900. m.

   c. How long was the car travelling at this constant speed?

   The car finally slows down from 35.0 m/s to 15.0 m/s in 4.00 s.

   d. What is the average acceleration (or deceleration) of the car during these 4.00 s?

e. What is the total distance the car travels during these 4.00 s?

f. What is the total distance the car travels since it started from rest?

g. What is the total time taken for the car to travel since it started from rest until it reaches a speed of 15 m/s?

h. **Use a pencil and ruler!** Draw a *displacement vs. time* graph, a *velocity vs. time* graph, and an *acceleration vs. time* graph for the car.

2. E: A car starts from rest and accelerates at a constant rate of 4.00 m/s^2 for 8.00 s.

   a. What is the speed of the car after 8.00 s?

   b. How much distance did the car travel during these 8.00 s?

   The car then moves at a constant speed for 12.0 s.

   c. How much distance did the car travel during these 12.0 s?

   The car then slows to a stop at a rate of 3.00 m/s^2.

   d. How much time did it take for the car to decelerate and stop?

   e. How much distance did the car travel when it decelerates?

   f. What is the total time taken for the car to travel?

   g. What is the total distance taken for the car to travel?

h. **Use a pencil and ruler!** Draw a *displacement vs. time* graph, a *velocity vs. time* graph, and an *acceleration vs. time* graph for the car.

3. E: You are rushing to the train station to catch your morning commute. The train leaves the train station from rest with an acceleration of $0.600\ \frac{\mathrm{m}}{\mathrm{s}^2}$. You arrive at the station exactly 4.00 s after the train leaves and you immediately start running after the train with a constant velocity of 8.50 m/s.

   a. How long after the train leaves the station do you catch up with the train?

b. How far from the train station do you catch up with the train?

c. With what minimum speed would you have to run in order to catch up with the train?

Take a break and play this video game:
https://universeandmore.com/motion-mapper/