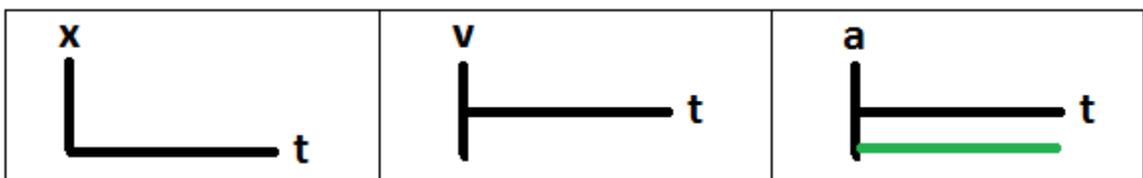


(2.06) - Kinematic Equations Worksheet

1. A car slows its velocity from 20 m/s to rest over a time of 4 seconds.
  - a. Create a qualitative graphs (no numbers) of X-T, V-T and A-T for the car's motion
  - b. Solve for the acceleration of the car
  - c. Solve for the displacement of the car
  
2. A skateboarder increases his velocity of 0.8 m/s to 1.4 m/s over a length of 3 meters. What was the acceleration of the skateboarder over this interval?
  
3. A car, initially moving at 5 m/s, increases its velocity at a rate of  $1.5 \text{ m/s}^2$ . If the car accelerates over a distance of 24 m, how fast will it be moving at the end of this interval?
  
4. A motorcycle moving at 30 m/s slows its velocity at a rate of 5 m/s each second. How long does it take the motorcycle to stop?
  
5. A train moves with a constant velocity of 25 km/hr over a distance of 260 m.
  - a. What is the acceleration of the train?
  - b. How long does it take the train to move the 260m?
  
6. A blue car and red car are placed 100 meters apart. The blue car begins from rest and accelerates towards the East at a rate of  $1.75 \text{ m/s}^2$ . The red car travels West with a constant speed of 6 m/s. How long will it take the cars to meet?
  
7. Use the written statements below to determine if acceleration is POSITIVE or NEGATIVE
  - a. An object moves in the negative direction while speeding up.
  - b. An object changes its velocity from +10 m/s to -10 m/s.
  - c. An object moves in the positive direction while slowing down.
  - d. An object changes its velocity from -4 m/s to +3 m/s.
  
8. Turn the Acceleration vs. Time graph below into its corresponding X-T and V-T graphs.

*\*Note, there are two potential answers for each graph. Can you find both?*



### Challenging

9. Janiah and Tiffany are watching a train pass where they stand at a train crossing. The train moves with a constant velocity of 5.5 m/s. Tiffany bets Janiah that she cannot touch the back of the train after it passes them by. Janiah accepts the bet, and with the train only 4.0 meters in front of where she stands, begins accelerating in its direction at a rate of  $1.3 \text{ m/s}^2$ . Janiah accelerates until she reaches her maximum velocity of 6.2 m/s, which she maintains for the rest of her run.
  - a. Draw a Position vs. Time graph that depicts the motions of both Janiah and the train, from the time Janiah begins running until she catches the train.
  - b. How long does it take Janiah to catch the train?