$v_f = v_i + at$ $\Delta x = \frac{1}{2}(v_i + v_f)t$ $v_f^2 = v_i^2 + 2a\Delta x$ $\Delta x = v_i t + \frac{1}{2} at^2$

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Directions: Identify each number given with a variable that stands for it. Use the information to solve for the desired quantity. **Remember the 4 equations for constant acceleration!!**

1. A ball starting from rest accelerates at 6 m/s^2 N down an inclined plane for 2.5 seconds.
   a. What is the velocity of the ball at the end of the 2.5 seconds?

      v_f =_____

   b. How far does the ball travel during the 2.5 seconds? Solve for the displacement.

      Δx =_____

2. An airplane flying at a velocity of 165 m/s S accelerates at a rate of 7.0 m/s^2 for 5.0 seconds.
   a. What is the final velocity of the plane?

      v_f = _____

   b. How far does the plane travel during the 5.0 seconds? Solve for the distance (*same as Δx without direction).*

      d =_____

3. A motorist uniformly accelerates from 26 m/s E to 32 m/s E in 4.0 seconds while passing another car.
   a. What is the acceleration of the car?

      a = _____

   b. What distance does the car travel while passing the other car?

      d =_____

4. A model airplane needs to achieve a velocity of 20 m/s W before it can take off. It is capable of accelerating at a rate of 0.80 m/s^2. What is the shortest runway that can be used to operate this plane?

   x = _____

5. A motorcycle starts from rest and accelerates uniformly for 5.0 seconds. During this time, it travels a distance of 140 meters. At what rate was it accelerating?

   a = _____