2. **Kinematics - Horizontal Motion Key Points**

\_\_\_\_\_\_\_\_\_\_\_\_\_ are important for all variables (except \_\_\_\_\_\_\_\_\_\_\_\_\_\_)

When \_\_\_\_\_\_\_\_\_ out of the five variables are known, the remaining variables can be solved for

Always include \_\_\_\_\_\_\_\_\_\_\_\_\_ in the answer

**The equations!!!**



(Remember that Δx = x – xo)

Sometimes you will need to use 2 of these equations so that you don’t have to solve a quadratic equation

Examples

1. A boat moves slowly out of a marina (so as to not leave a wake) with a speed of 1.50 m/s. As soon as it passes the breakwater, leaving the marina, it speeds up at 2.40 m/s2.

a) How fast is the boat moving after accelerating for 5 seconds?

b) How far did the boat travel during that time?

2. You are driving through town at 12 m/s when suddenly a ball rolls out in front of your car. You apply the brakes and slow down at 3.5 m/s2. How far do you travel before coming to a complete stop?

3. A spacecraft is travelling with a velocity of 3250 m/s. Suddenly the retrorocket is fired, and the spacecraft begins to slow down with an acceleration whose magnitude is equal to 10 m/s2. What is the velocity of the spacecraft is 215 km, relative to the point where the retrorocket began firing?

4. (Qualitative – no numbers) A bus driver makes an emergency stop by slamming on the brakes and skidding to a stop. How far would the bus have skidded if it had been traveling twice as fast?

5. A model rocket is launched straight upward with an initial speed of 50 m/s. It speeds up with a constant upward acceleration of 2.0 m/s2 until the engine stops at an altitude of 150 m. How much time does it take for this to happen?