Do Now

- In your notes: write the three kinematics equations.
- Solve the following: A car is driving at 17.3m/s. She hits the breaks and comes to a stop in 3.1 seconds. What is her acceleration?

$a = -5.58\ m/s^2$

A car is driving at 17.3m/s. The driver hits the breaks and comes to a stop in 3.1 seconds. How far does she travel during this time?

K: $V_i = 17.3\ m/s$, $V_f = 0\ m/s$, $t = 3.1\ s$ $a = -5.6\ m/s^2$

U: Δx

Eqns:

$$\Delta x = 26.82\ m$$

Today

- Complex 1-D kinematics problems.
- Multi-body 1-D kinematics problems.

Tonight

- Quest problems.
- You will have the information to solve all of the problems on Quest by the time class ends today.
- If you have tried a problem more than once and are stuck, I will take a few questions at the beginning of class tomorrow.
- Please don’t wait until the last minute.

Process/Checklist

- What do you know?
- Is it what the problem is asking for?
- Solve for what you can. This becomes a known.
- Repeat until you have the variable you are looking for.

One direction is walking down the street at 0.8m/s after a long concert. A flock of screaming fans sees them and starts chasing them. The boys escape by accelerating to 4.5m/s while running for a taxi 20m away, how long does it take them to get there?

K: $V_i = 0.8\,m/s$, $V_f = 4.5\,m/s$, $\Delta x = 20m$

U: t

$a = 0.79\,m/s^2$

One direction is walking down the street at 0.8m/s after a long concert. A flock of screaming fans sees them and starts chasing them. The boys escape by accelerating to 4.5m/s while running for a taxi 20m away, how long does it take them to get there?

K: $a = 0.49\ m/s^2$, $V_i = 0.8\ m/s$, $V_F = 4.5\ m/s$, $\Delta x = 20\ m$

U: $t \geq 7.55$ seconds

An archer fires an arrow that accelerates at 148m/s^2. It leaves the bow going 143m/s. Over what distance is the arrow is being accelerated?

K: $a = 148\ m/s^2$, $V_i = 0\ m/s$, $V_F = 143\ m/s$

$t = 0.966\ s$

U: $\Delta x = 71.04\ m$

$70.6\ m$ $69.08\ m$

An archer fires an arrow that accelerates at 148m/s^2. It leaves the bow going 143m/s. How far has it traveled 5 seconds after it leaves the bow assuming it doesn't hit something?

Can You Perceive Acceleration?

Two Body Problems: Checklist

- Two objects that meet up in both **time and space**.
- Use equations to describe the motion of both bodies.
- Set them equal to one another and solve for one unknown.
- See examples.

A red car goes down the highway at 25m/s. It passes an onramp and a blue car starts from rest and accelerates at 5.4m/s^2. How long will it take for the blue car to catch the red car?

A jogger runs past a sitting dog at 3.4m/s. The dog begins to chase the jogger and accelerates at 1.2m/s^2. How far does the jogger get before the dog catches him?

Objects at different positions.

- Still 2 body problems.
- We know that $\Delta x = Xf - Xi$.
- Break them up in the equations.
- The process is then the same as other 2 body problems.

A blue car moves down the highway at 28m/s. A red car is 32m behind it traveling at 40m/s and accelerating at 3m/s. How long does it take for the red car to catch the blue car?

A blue car moves down the highway at 28m/s. A red car is 32m behind it traveling at 40m/s and accelerating at 3m/s. How far does the blue car travel during this time?

A blue car moves down the highway at 28m/s. A red car is 32m behind it traveling at 40m/s and accelerating at 3m/s. How fast is the red car going when is passes the blue car?

Remainder of Class

- Work on Quest in small groups.
- Having trouble?
  - Go through the checklists first.
  - Ask your neighbor.
  - Ask Mr. Breish.