What about getting rid of time?

The only formula we have left to discuss is one that deals with acceleration, but not with time. Every formula we have learned is time-dependant. Often we do not know (or care) about the time interval, so an appropriate formula is in order:

$$v_f^2 = v_i^2 + 2ad$$

You are traveling at 64.9 km/hr and your car brakes at -2.62 m/s^2. If a cat crosses the road in front of you, how far away must it be to avoid becoming a wet spot on the pavement?

First of course, we converted km/h to m/s by dividing by 3.6… 64.9 km.h = 18.0 m/s

Next, we algebra our new formula for d….

$$\frac{(v_f^2 - v_i^2)}{2a} = d$$

So far, all of our problems have moved horizontally. What if we go vertical? We already know several things:

What pulls us down? _____!

Which accelerates everything near the earth's surface at _____ m/s^2.

How fast are we moving when we get to the highest point? _____!

How long does it take to come back down?

_____

I hit a baseball straight up into the air with an initial velocity of 14.89 m/s.

How high will it go?

How long will it take for the ball to bash me in the head?

How fast is it going when it hits me?

We know:

Which formula to choose?

What d formula has v_i, a and v_f?

How much time just to go up?

What t formula has v_i, a and v_f?

We *could* pick a formula and do the math, but it is so much easier to do logic…

Time up = time down

Distance up = distance down

Acceleration = constantly down

So velocity up =