Physics math... the next day.

Part 1: Unit conversions... I will NEVER make you convert units in a physics question. That is physics 11 stuff. I know they are easy, but you MUST show your work and cancelled units.

1) How many seconds are there in a year?

$$1\,\text{year} \times \frac{365\,\text{days}}{1\,\text{year}} \times \frac{24\,\text{hours}}{1\,\text{day}} \times \frac{60\,\text{min}}{1\,\text{hour}} \times \frac{60\,\text{sec}}{1\,\text{min}} = 31536000\,\text{s}$$

2) How many feet are there in 3.2 meters? (There are 3.28 feet in one meter)

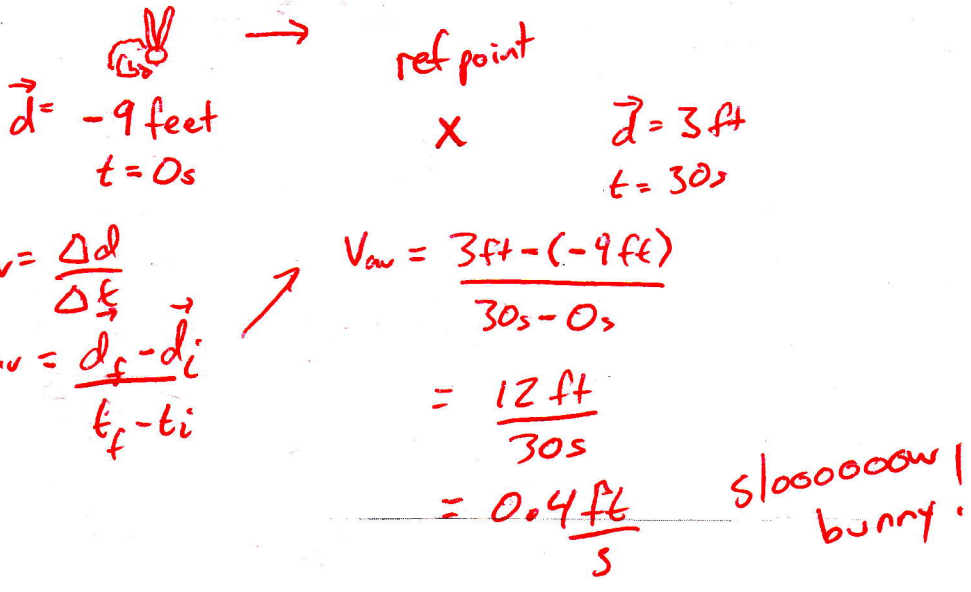
$$3.2\,\text{m} \times \frac{3.28\,\text{feet}}{1\,\text{m}} = 10.496\,\text{ft}$$

3) How many pounds are there 9.1 stone? (There are 14 pounds in one stone)

$$9.1\,\text{stone} \times \frac{14\,\text{pounds}}{1\,\text{stone}} = 127.4\,\text{pounds}$$

Part 2: Slightly more complicated physics math. This is as hard as it will get on the test. Remember that the drawing is worth almost as much as the math!

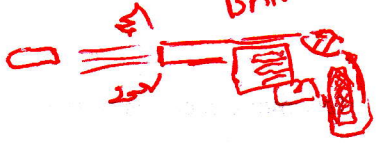
4) At 30 seconds after 12 pm, a rabbit standing 9 feet west of a reference point starts moving east at a constant velocity. If the rabbit gets to 3 feet east of the reference point at 12:01 exactly, what is it's velocity?



5) A .357 magnum fires a bullet to the left at a constant velocity of $427\frac{m}{s}$, 2 seconds after a it is fired, the bullet passes a measuring stick. 4 seconds after it is fired, it strikes a block of ballistics gel 1950 m left of the origin of the gunshot. How far away from the origin is the measuring stick?

let left be positive

$V = 427\frac{m}{s}$



$t = 4s$
$d = 1950m$

$t = 2s$
$d = ?$

$\Delta d = V_{av}\Delta t$
$\vec{d}_f - \vec{d}_i = V_{av}(t_f - t_i)$
$1950m - \vec{d}_i = 427\frac{m}{s} \times (4s - 2s)$

$\Rightarrow 1950m - d_i = 427\frac{m}{s} \times 2s$
$-d_i = 854m - 1950m$
$d_i = 1096m$

6) A track and field runner is running at a constant velocity of $7.91\frac{m}{s}$ to the right. 6 s after the race has started, he is handed a baton 48 m to the right of the starting line. If the finish line is 100 m to the right of the starting line, what is the team's time?

let right be "+"

baton

$V = 7.91\frac{m}{s}$

$t = 6s$
$\vec{d} = 48m$

$t = ?$
$\vec{d} = 100m$

Do questions 10,18 on page 376/377

$\Delta t = \frac{\Delta d}{V_{av}}$

$t_f - t_i = \frac{\vec{d}_f - \vec{d}_i}{V_{av}}$

$t_f - 6s = \frac{100m - 48m}{7.91\frac{m}{s}}$

$t_f = 12.57s$