A *Find Everything* Review Problem:

A 0.2kg object is launched by a constant pushing force that slides it 1m in a straight line along the top of a surface. The force, which acts parallel to the surface, accelerates the object from rest and acts only during the time that the object is sliding. After 1m of sliding, the object, which has reached a speed of 14m/s, passes off of the edge of the surface and freefalls to the ground (at a position of y=0m) over a time of 4 seconds. During that time, the object drops a distance of 60m, vertically and ends up at an X position of -12m. The coefficient of friction between the object and the surface on which it slides is 0.4. Find everything.

Specifically…

First, for the free-falling interval, find:

$X_0 =$	$Y_0 =$	$\Theta_0 =$
$X =$	$Y =$	$\Theta =$
$\Delta X =$	$\Delta y =$	$V_0 =$
$\Delta t =$	$\Delta t =$	$V =$
$V_{0x} =$	$V_{0y} =$	
$V_x =$	$V_y =$	
$\overline{V_x} =$	$\overline{V_y} =$	
$a_x =$	$a_y =$	

Second, for the sliding interval, find the following (**Note that I chose to use the symbol S for position on the surface. The surface is tilted, and I did not want the final position to be confused with X_0, above. You can change it to X if you want, but make sure that you don't confuse it with the X in the free-fall portion of the problem.):

$\Theta =$	
$S_0 =$	$\Sigma F =$
$S =$	$W =$
$\Delta S =$	$W_{\perp} =$
$\Delta t =$	$W_{\parallel} =$
$V_0 =$	$F_N =$
$V =$	
$\overline{V} =$	$F_{Fr} =$
$a =$	$F_{push} =$

Formulas:

$$\bar{V} = \frac{V + V_0}{2} \quad \bar{V} = \frac{\Delta x}{\Delta t} \quad V = V_0 + at \quad Range = \frac{V_0^2 \sin 2\theta}{g}$$

$$a = \frac{\Delta V}{\Delta t} \quad \Delta x = V_0 t + \frac{1}{2} a t^2 \quad V^2 = V_0^2 + 2a\Delta x$$

$$\Sigma F = ma \quad F_{Fr} = \mu F_N \quad w = mg$$

$$\Sigma F_c = \frac{mv^2}{r} \quad a_c = \frac{v^2}{r}$$

$$F_g = G\frac{m_1 m_2}{r^2} \quad \frac{T_A^2}{T_B^2} = \frac{r_A^3}{r_B^3}$$