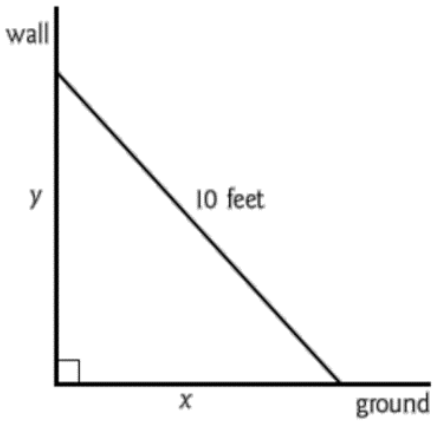
Your friend was given the following problem to complete:

A 10 foot long ladder rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 1 foot/second, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is six feel from the wall?

Here is your friend's response, together with the picture drawn:



We want to find $\frac{dy}{dt}$.
And we can set up $x^2 + y^2 = 100$.
Now, we want $\frac{dy}{dt}$ when $\frac{dx}{dt} = 1$ and $x = 6$.
Substituting $x = 6$ into the equation gives $36 + y^2 = 100$.
Taking derivatives yields $2y\frac{dy}{dt} = 0$ so that $\frac{dy}{dt} = 0$.

1. Why does this answer not make any sense?
2. Where did your friend make a mistake?
3. Write a correct solution to the problem.