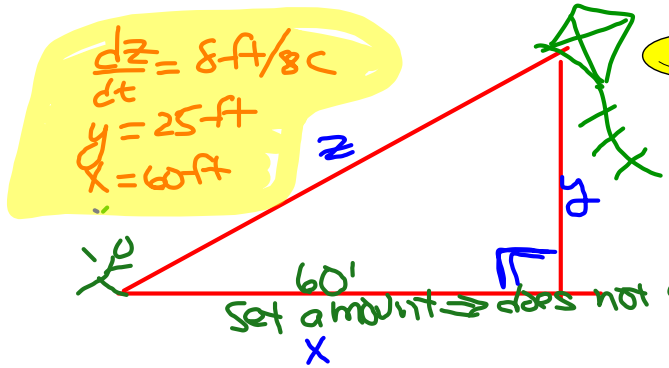
Related Rates WP

1. Must differentiate both sides implicitly
2. Draw a picture (if possible)
3. Identify all variables & quantities
4. Identify what you are looking for.
5. Important: You must find an equation & differentiate before you substitute constants in.
6. If a quantity is changing ⇒ a number cannot be substituted in for that until after differentiation

If a number is a constant ⇒ you can substitute in the constant @ the beginning.

A Kite is being paid out at the rate of 8 feet per second from a point on the ground 60 feet from an observer. Find the rate of change of the distance between the person and the launching point of the kite when the kite is 25 feet above the ground.



25 ft is a changing amt → don't put that in before diff.

Set amount ⇒ does not change

$x^2 + y^2 = z^2$

$60^2 + y^2 = z^2$ differentiate both sides w/ respect to time

$0 + 2y\frac{dy}{dt} = 2z\frac{dz}{dt}$

$2y\frac{dy}{dt} = 2z\frac{dz}{dt}$

$2(25)\frac{dy}{dt} = 2(65)(8)$

$50\frac{dy}{dt} = 1040$

$\frac{dy}{dt} = \frac{1040}{50} = 20.8$ ft/sec

$z^2 = x^2 + y^2$
$z^2 = 60^2 + 25^2$
$z^2 = 4225$
$z = 65$

A balloon rises at the rate of 8 feet per second from a point on the ground 60 feet from an observer. Find the rate of changed the distance between the person and the balloon. of the angle of elevation when the balloon is 25 feet above the ground.