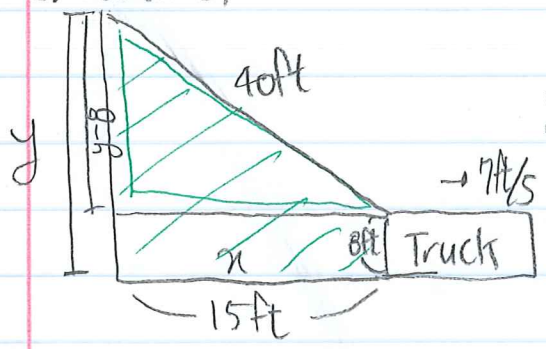
+3 EC
(unit bubbles?)

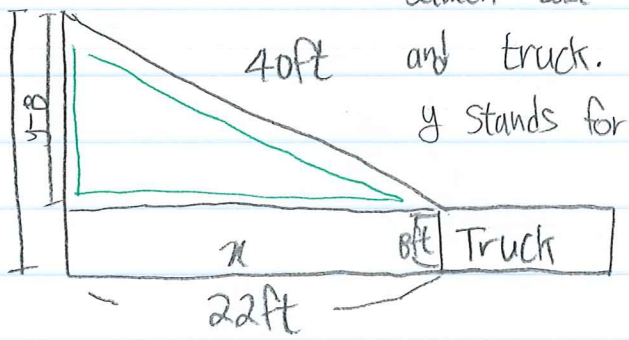
Extra credit

5) ① Notation

x stands for distance between base of building and truck.
y stands for height of building



0 second

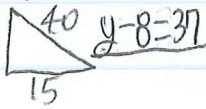


1 second

we want to find speed of $y = y' = \frac{dy}{dt} = \frac{dy}{dt}\Big|_{x=20}$ when $x=20$ and $\frac{dy}{dt}\Big|_{x=35}$ $x=35$

② Initially, figure looks like . we cut to make it like right triangle ( ) for both figures. Since we know the height of the fire truck (8ft), we can substract the height of the building (y) from the fire truck. So height from the top of the truck to the top of the building will be y-8. By knowing this we can make equation

$40^2 = (y-8)^2 + x^2$



we know $\frac{dx}{dt}$ is 5 miles/hours

③ $\frac{d}{dt}(40^2 = (y-8)^2 + x^2)$

$0 = 2(y-8)\frac{dy}{dt} + 2x\frac{dx}{dt}$ ✓

$= -2x\frac{dx}{dt} = 2(y-8)\frac{dy}{dt}$

$= \frac{-2x\frac{dx}{dt}}{2(y-8)} = \frac{dy}{dt}$ (y-8 → in feet)

$= \frac{-(2)(20)(5\ \text{miles/h})}{2(37)}$ (5 miles/h → in miles/hour)

unit problems? convert everything to ft or miles?

$= -2.7$ miles/hours when $x=20$

$\frac{-(2)(35)(5\ \text{miles/h})}{2(37)}$

$= -4.7$ miles/hours when $x=35$