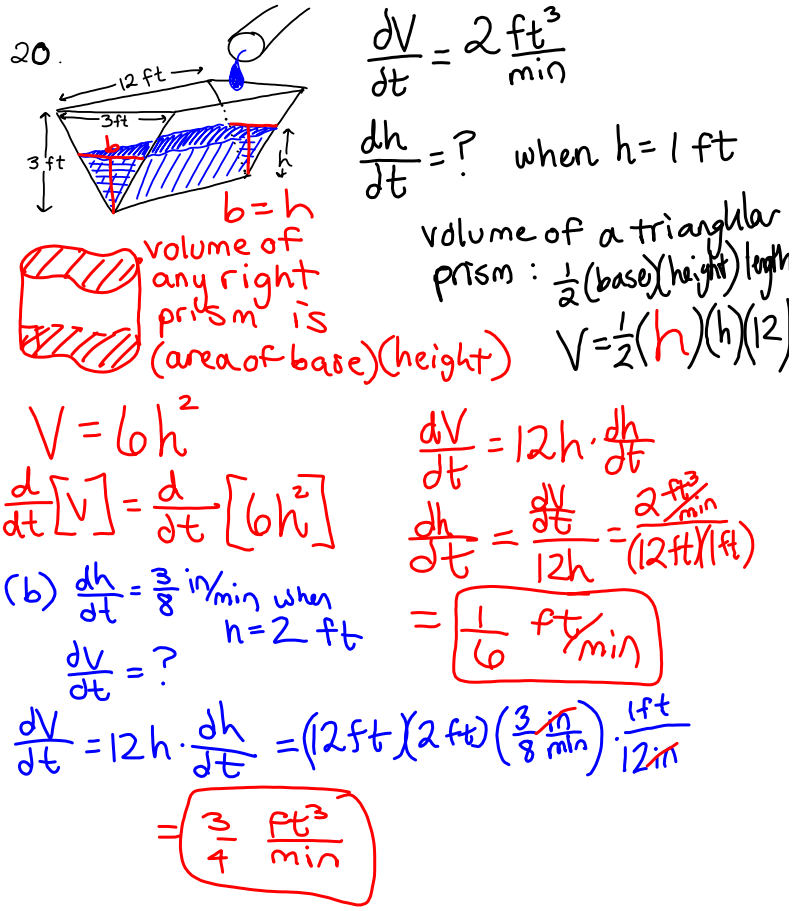
Assignments for the week of 10/3:

- Read 2.5-2.6
- 45 minutes of Khan Academy
- Textbook assignment due Friday, 10/14:
  2.5 # 1-39 odd; 43, 47 - Implicit Differentiation
  2.6 # 15-23 odd - Related Rates
  2.6 # 25, 27, 35 - Related Rates (more challenging problems)

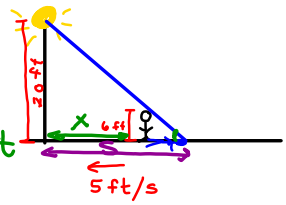
- Upcoming:

3.1 # 17-35 odd - Absolute Extrema on an Interval
3.2 # 9-21 odd - Rolle's Theorem
3.2 # 33-45 odd - Mean Value Theorem
3.3 # 17-39 odd - Increasing, Decreasing, and Relative Extrema
3.4 #15-39 odd - Inflection Points and Concavity



36. A man 6 ft tall walks toward a light that is 20 ft above the ground at a rate of 5 ft/s. When he is 10 ft from the base of the light,

(a) at what rate is the tip of his shadow moving? $\frac{ds}{dt} = ?$ when $x = 10$ ft



Let s = the distance from the light to the tip of the shadow

Let x = the distance from the man to the pole

$\frac{dx}{dt} = -5\ \frac{ft}{s}$ $\qquad \frac{20}{s} = \frac{6}{s-x}$

$\frac{d}{dt}[7s] = \frac{d}{dt}[10x]$ $\qquad 20(s-x) = 6s$

$20s - 20x = 6s$

$14s = 20x$

$7s = 10x$

$7 \cdot \frac{ds}{dt} = 10 \cdot \frac{dx}{dt}$

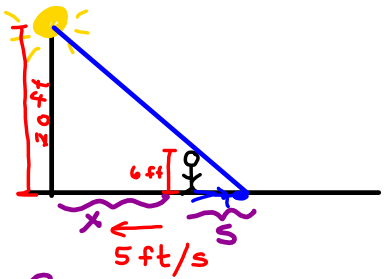
$\frac{ds}{dt} = \frac{10}{7}(-5\ ft/s)$

$= \boxed{-\frac{50}{7}\ ft/s}$

36. A man 6 ft tall walks toward a light that is 20 ft above the ground at a rate of 5 ft/s. When he is 10 ft from the base of the light,

~~(a) at what rate is the tip of his shadow moving?~~

(b) at what rate is the length of his shadow changing?



s = length of shadow $\frac{ds}{dt} = ?$

x = distance from man to pole $\frac{dx}{dt} = -5\ ft/s$

$\frac{20}{x+s} = \frac{6}{s}$

$20s = 6(x+s)$

$20s = 6x + 6s$

$14s = 6x$

$7s = 3x$

$7 \cdot \frac{ds}{dt} = 3 \cdot \frac{dx}{dt}$

$\frac{ds}{dt} = \frac{3}{7} \cdot (-5)$

$= \boxed{-\frac{15}{7}\ ft/s}$