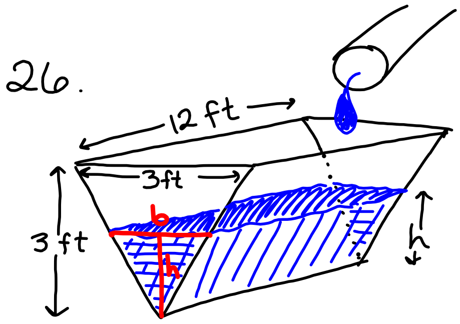
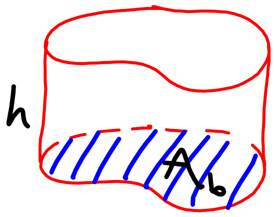
26.



$\boxed{\frac{dV}{dt}} = 2\ ft^3/min$ $\left(\frac{b}{h} = \frac{3}{3} \Rightarrow b = h \right)$

$\boxed{\frac{dh}{dt}} = ?$ when $\boxed{h} = 1\ ft$



Volume of any right prism is $A_b \cdot h$

$V = (\text{area of } \Delta)(12)$ ← ok to plug in constant b/c stays constant

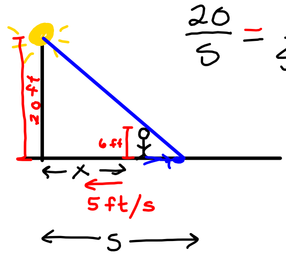
$V = (\frac{1}{2}bh)(12)$

$V = 6h^2$

$$\frac{dV}{dt} = 12h \cdot \frac{dh}{dt}$$

$$\frac{dh}{dt} = \frac{\frac{dV}{dt}}{12h} = \frac{2}{12(1)} = \boxed{\frac{1}{6}\ ft/min}$$

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?



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

Let s = distance between light & tip of shadow.

$\frac{ds}{dt} = ?$ when $x = 10\ ft$ $\frac{dx}{dt} = -5\ ft/s$

x = distance between man & light

$20(s-x) = 6s$

$20s - 20x = 6s$

$20s - 6s = 20x$

$14s = 20x$

$s = \frac{20}{14}x$

$s = \frac{10}{7}x$

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

$= \frac{10}{7}(-5)$

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

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,

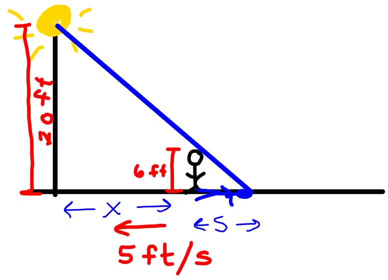
x = dist. betw man & light

$dx/dt = -5$ ft/s

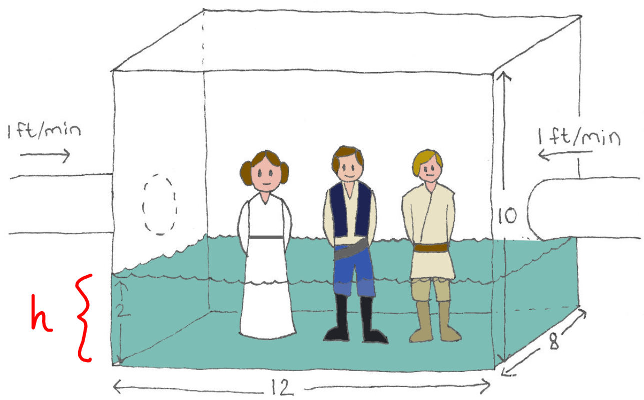
(b) at what rate is the length of his shadow changing?

s = length of shadow

$\frac{ds}{dt} = ?$



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



$$\frac{dh}{dt} = ? \text{ when } h = 6\text{ft}$$

$$\frac{dx}{dt} = -2 \text{ ft/min}$$

$$V_{water} = 8(12)(2)$$

$$V_{water} = 8xh$$

$$\frac{\cancel{8}(12)(2)}{x} = \frac{\cancel{8}\cancel{x}h}{\cancel{x}}$$

X

when $h = 6$

$x = \frac{24}{h} = \frac{24}{6} = 4$

$$h = \frac{24}{x} = 24x^{-1}$$

$$\frac{dh}{dt} = -24x^{-2} \cdot \frac{dx}{dt} = \frac{-24}{x^2} \cdot \frac{dx}{dt} = \frac{-24}{4^2} \cdot (-2) = \boxed{3 \text{ ft/min}}$$