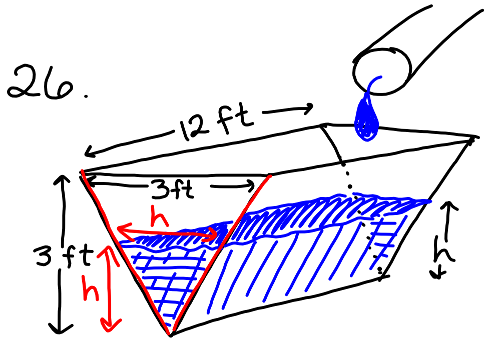
26.



$2\ \text{ft}^3/\text{min} = \frac{dV}{dt}$, $\frac{dh}{dt} = ?$ when $h = 1\ \text{ft}$

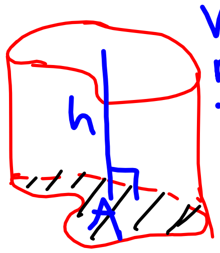
$V = \text{area of } \Delta \cdot 12$

$V = \frac{1}{2}h^2 \cdot 12$

$V = 6h^2$

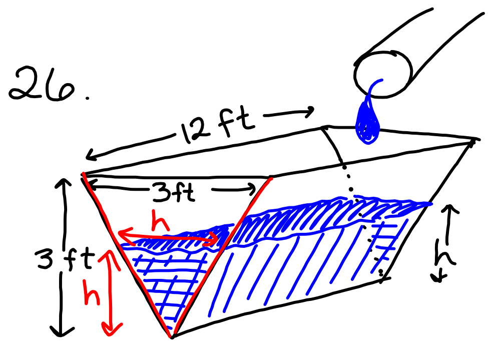
$\frac{dV}{dt} = 12h \cdot \frac{dh}{dt}$

$\frac{dV/dt}{12h} = \frac{dh}{dt} = \frac{2}{12 \cdot 1} = \boxed{\frac{1}{6}\,\frac{\text{ft}}{\text{min}}}$



Volume of any right prism is area of base times height

26.



$V = 6h^2$; $\frac{dh}{dt} = \frac{3}{8}\ \text{in/min}$

$\frac{dV}{dt} = ?$ when $h = 2\ \text{ft}$

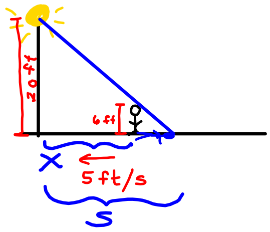
$\frac{dV}{dt} = 12h \cdot \frac{dh}{dt}$

$= (\cancel{12}\ \text{ft})(\cancel{2}\ \text{ft})\left(\frac{3\ \cancel{\text{in}}}{\underset{4}{\cancel{8}}\ \text{min}}\right) \cdot \frac{1\ \text{ft}}{\cancel{12}\ \cancel{\text{in}}}$

$\frac{dV}{dt} = \boxed{\frac{3}{4}\ \text{ft}^3/\text{min}}$

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?



Let x = distance from light to man

Let s = the distance from light to tip of shadow

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

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

$$20(s-x) = 6s$$

$$20s - 20x = 6s$$

$$14s = 20x$$

$$7s = 10x$$

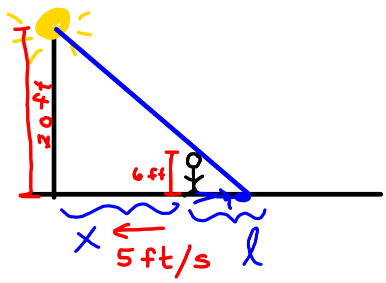
$$7 \cdot \frac{ds}{dt} = 10 \cdot \frac{dx}{dt}$$

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

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

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

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,



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

Let x = dist. from man to light

ℓ = length of shadow

$\frac{d\ell}{dt} = ?$ when $x = 10\,ft$; $\frac{dx}{dt} = -5\,ft/s$

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

$$20\ell = 6x + 6\ell$$

$$14\ell = 6x$$

$$\ell = \frac{3}{7}x$$

$$\frac{d\ell}{dt} = \frac{3}{7}\frac{dx}{dt} = \frac{3}{7}(-5) = \boxed{\frac{-15}{7}\ ft/s}$$