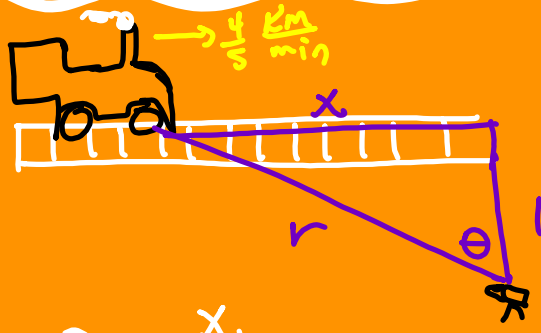
Related Rates 3

8/



Moment
- train is 2 Km from camera
- $\frac{\pi}{3}$ rad.

$$\tan\theta = \frac{x}{1}$$

$\frac{r}{x} = \frac{2}{1}$, $\sec\frac{\pi}{3}$

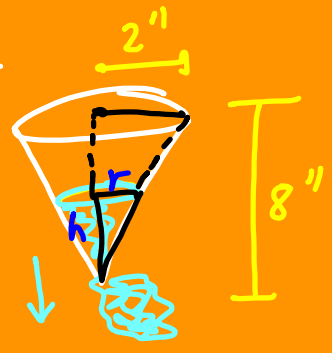
$$\sec^2\theta \frac{d\theta}{dt} = \frac{dx}{dt}$$

$$(2)^2 \frac{d\theta}{dt} = -\frac{4}{5}$$

$$4\frac{d\theta}{dt} = -\frac{4}{5}$$

$$\frac{d\theta}{dt} = -\frac{1}{5} \frac{\text{rad}}{\text{min}}$$

9



$3\ \frac{in^3}{s}$

Find $\frac{dh}{dt}$

$\frac{r}{h} = \frac{2}{8}$

$r = \frac{1}{4}h$

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi\left(\frac{1}{4}h\right)^2 \cdot h$

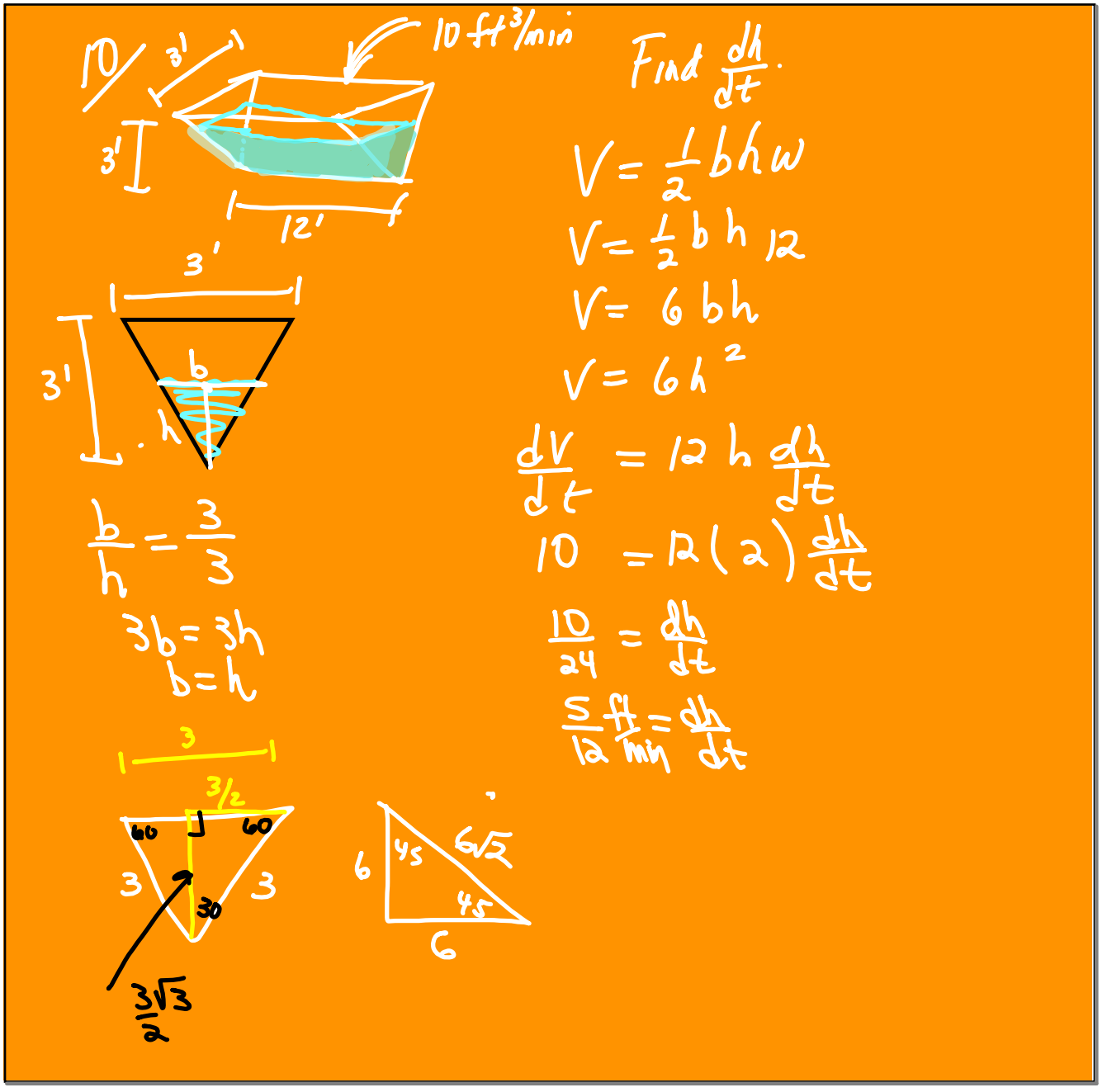
$V = \frac{1}{48}\pi h^3$

$\frac{dV}{dt} = \frac{1}{16}\pi h^2 \frac{dh}{dt}$

$-3 = \frac{1}{16}\pi(5)^2 \frac{dh}{dt}$

$\frac{16}{25\pi} \cdot -3 = \frac{25}{16}\pi \frac{dh}{dt}$

$-\frac{48}{25\pi}\ \frac{in}{s} = \frac{dh}{dt}$


10
3'
3'
12'
10 ft³/min
Find dh/dt.
V = 1/2 b h w
V = 1/2 b h 12
V = 6 b h
V = 6 h²
dV/dt = 12 h dh/dt
10 = 12(2) dh/dt
10/24 = dh/dt
5/12 ft/min = dh/dt
3'
3'
b
h
b/h = 3/3
3b = 3h
b = h
3
3/2
60
60
3
3
30
3√3/2
6
45
6√2
45
6

October 27, 2025