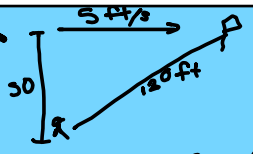
38




$120^2 - 50^2 = b^2$

$\sqrt{11900} = \sqrt{b^2}$

$10\sqrt{119} = b$

$a^2 + b^2 = c^2$

$\frac{d}{dx}(50^2 + b^2 = c^2)$

$0 + 2b\frac{db}{dt} = 2c\frac{dc}{dt}$

$2(10\sqrt{119})(5) = 2(120)\frac{dc}{dt}$

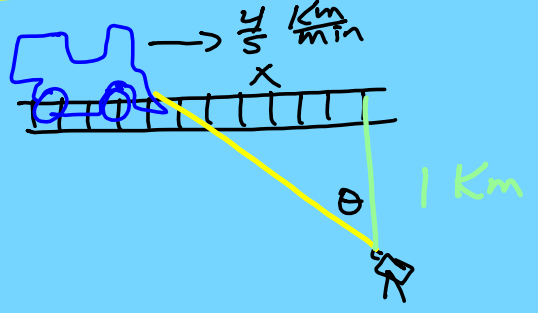
$100\sqrt{119} = 240\frac{dc}{dt}$

$\frac{100\sqrt{119}}{240} = \frac{dc}{dt}$

$\frac{5\sqrt{119}}{12} \approx 4.55 \text{ ft/s}$

# Related Rates 3

8/




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

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

$$\left(\sec\frac{\pi}{3}\right)^2 \frac{d\theta}{dt} = -\frac{4}{5}$$

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

$$\frac{1}{4}\cdot 4\,\frac{d\theta}{dt} = -\frac{4}{5}\cdot\frac{1}{4}$$

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

November 2, 2021

9/


$3 \frac{m^3}{sec}$

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

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

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

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

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

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

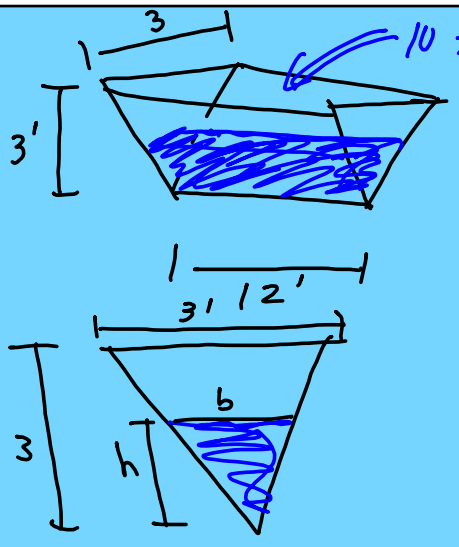
$\frac{dV}{dt} = \frac{1}{16}\pi h^2 \frac{dh}{dt}$

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

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

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

November 2, 2021




$V = \frac{1}{2} b h \ell$ (12)

$V = 6bh$

$V = 6h^2$

$\frac{3}{3} = \frac{b}{h}$

$h = b$

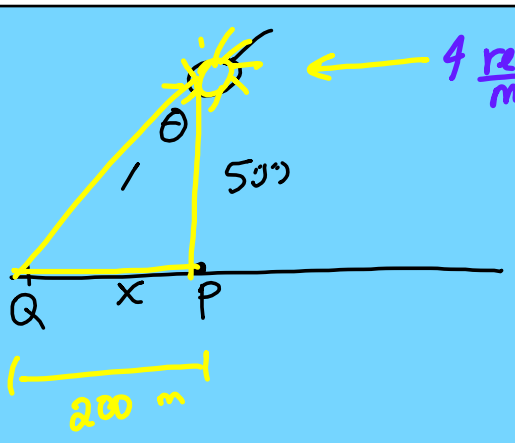
$\frac{dV}{dt} = 12h \frac{dh}{dt}$

$10 = 12(2)\frac{dh}{dt}$

$\frac{10}{24} = \frac{24}{24}\frac{dh}{dt}$

$\frac{5}{12} \frac{ft}{min} = \frac{dh}{dt}$

#50




$4 \frac{\text{rev}}{\text{min}} = 8\pi \frac{\text{rad}}{\text{min}}$

$\therefore$