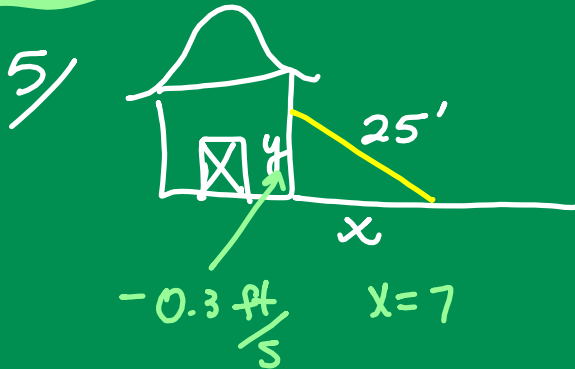


RELATED RATES 2



$$A = \frac{1}{2}xy$$

$$\frac{dA}{dt} = \frac{1}{2} \left[x \cdot \frac{dy}{dt} + y \cdot \frac{dx}{dt} \right]$$

$$\frac{dA}{dt} = \frac{1}{2} \left[7(-0.3) + (24)\left(\frac{36}{35}\right) \right]$$

$$\approx 11.29 \frac{\text{ft}^2}{\text{sec}}$$



$$y^2 + 49 = 625$$

$$\sqrt{y^2} = \sqrt{576}$$

$$y = 24$$

$$\frac{d}{dt} [x^2 + y^2 = 25^2]$$

$$2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 0$$

$$2(7) \frac{dx}{dt} + 2(24)(-0.3) = 0$$

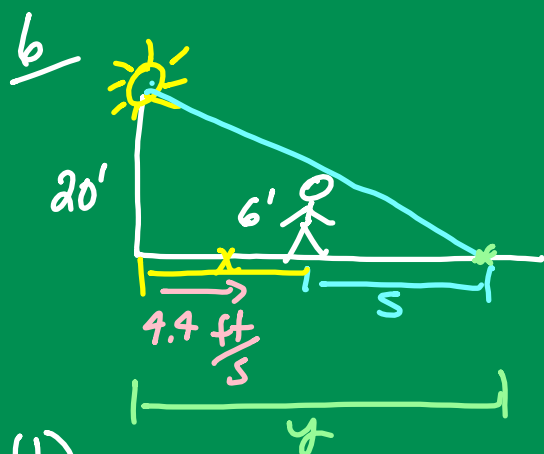
$$14 \frac{dx}{dt} - 14.4 = 0$$

$$14 \frac{dx}{dt} = \frac{14.4}{14}$$

$$\frac{dx}{dt} = \frac{144}{140}$$

$$= \frac{72}{70}$$

$$= \frac{36}{35}$$



(b)

$$y = x + s$$

$$\frac{dy}{dt} = \frac{dx}{dt} + \frac{ds}{dt}$$

$$\frac{dy}{dt} = 4.4 + 1.89$$

$$= 6.29 \text{ ft/s}$$

$$\frac{6}{s} = \frac{20}{x+s} \quad \frac{x}{2} = \frac{7}{s}$$

$$6x + 6s = 20s$$

$$-6s$$

$$\frac{d}{dt} [6x = 14s]$$

$$6 \frac{dx}{dt} = 14 \frac{ds}{dt}$$

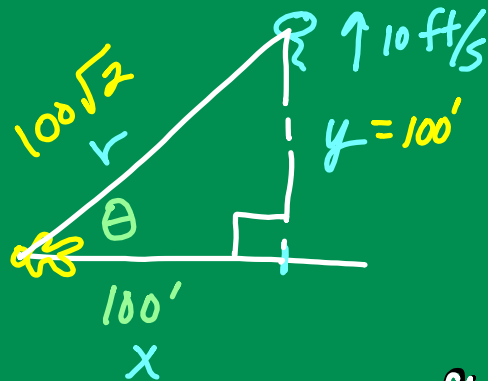
$$6(4.4) = 14 \frac{ds}{dt}$$

$$\frac{26.4}{14} = 14 \frac{ds}{dt}$$

$$\frac{1.89}{14}$$

$$1.89 \frac{\text{ft}}{\text{s}} = \frac{ds}{dt}$$

1



$$100^2 + 100^2 = r^2$$

$$\frac{d}{dt} \left[\tan \theta = \frac{y}{100} \right]$$

$$\sec^2 \theta \frac{d\theta}{dt} = \frac{1}{100} \frac{dy}{dt}$$

$$\frac{\text{ft}}{\text{ft}} \left(\frac{100\sqrt{2}}{100} \right)^2 \frac{d\theta}{dt} = \frac{1}{100} \left(10 \frac{\text{ft}}{\text{s}} \right)$$

$$\frac{2}{2} \frac{d\theta}{dt} = \frac{1}{10}$$

$$\frac{d\theta}{dt} = \frac{1}{20} \frac{\text{rad}}{\text{sec}}$$