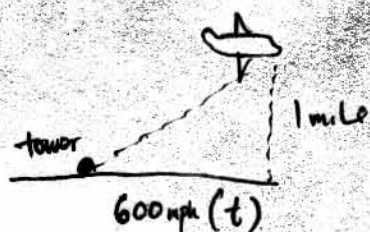


#12



D = distance between plane and tower

$$D^2 = 1^2 + (600t)^2 = 1 + 360,000t^2$$

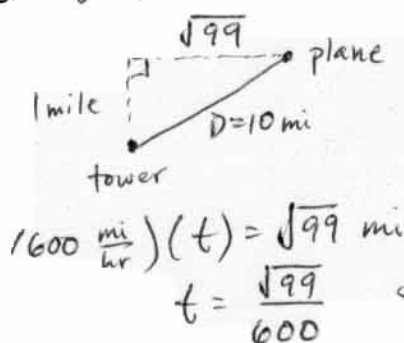
we want $\frac{dD}{dt}$ @ $D = 10$ miles

$$D^2 = 1 + 360,000t^2$$

$$\frac{d}{dt} (D^2) = \frac{d}{dt} (1 + 360,000t^2)$$

$$2D \frac{dD}{dt} = 0 + 720,000t$$

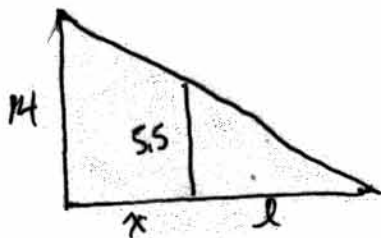
when $D = 10$ miles what t ?



so $2D \frac{dD}{dt} = 0 + 720,000t$
 $2(10) \frac{dD}{dt} = 720,000 \left(\frac{\sqrt{99}}{600} \right)$

$$\boxed{\frac{dD}{dt} = 597 \frac{\text{mi}}{\text{hr}}}$$

#14



similar triangles

$$\frac{x+l}{14} = \frac{l}{5.5}$$

(cross multiply)

$$14l = 5.5x + 5.5l$$

$$8.5l = 5.5x$$

we want $\frac{dl}{dt}$

$$\frac{d}{dt} (8.5l) = \frac{d}{dt} (5.5x)$$

$$8.5 \frac{dl}{dt} = 5.5 \frac{dx}{dt} \quad \left(\frac{dx}{dt} = 4 \frac{\text{ft}}{\text{sec}} \right)$$

$$\frac{dl}{dt} = \frac{5.5(4)}{8.5} = 2.588 \frac{\text{ft}}{\text{s}}$$