by pythagorean theorem,

$$D^2 = (10t)^2 + 0.5^2 \quad , \quad D = \text{distance between cars}$$

$$\frac{d}{dt} D^2 = \frac{d}{dt}\left[(10t)^2 + 0.5^2\right]$$

$$2D \frac{dD}{dt} = \frac{d}{dt} 100t^2 + 0$$

$$2D \frac{dD}{dt} = 200t$$

we know $t = 2$ hrs

$$D = \sqrt{(10 \cdot 2)^2 + 0.5^2} = 20.01 \text{ mi}$$

$$2(20.01 \text{ mi}) \frac{dD}{dt} = 200(2)$$

$$\frac{dD}{dt} = 10.00 \frac{\text{mi}}{\text{hr}}$$

b) $D = 40$ mi what is t?

$$40^2 = (10t)^2 + 0.5^2$$

$$100t^2 = 1599.75$$

$$t = 4.00 \text{ hr}$$

$$2D \frac{dD}{dt} = 200t$$

$$2(40) \frac{dD}{dt} = 200(4.00)$$

$$\frac{dD}{dt} = 10.00 \frac{\text{mi}}{\text{hr}}$$