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$$V_1 = 22 \text{ m/s}$$

$$V_2 = 14 \text{ m/s}$$

$$\Delta d = 125 \text{ m}$$

a)  $a = ?$

b)  $\Delta t = ?$

a)  $a = \frac{\Delta V}{\Delta t}$

$$a = \frac{V_2 - V_1}{\Delta t}$$

$$a = \frac{14 \text{ m/s} - 22 \text{ m/s}}{6.9 \text{ s}}$$

$$a = \frac{-8 \text{ m/s}}{6.9 \text{ s}}$$

$$\boxed{a = -1 \text{ m/s}^2} \quad -1.152 \text{ m/s}^2$$

b)  $V_{\text{ave}} = \frac{\Delta d}{\Delta t}$

$$\frac{V_1 + V_2}{2} = \frac{\Delta d}{\Delta t}$$

$$\frac{22 \text{ m/s} + 14 \text{ m/s}}{2} = \frac{125 \text{ m}}{\Delta t}$$

$$18 \text{ m/s} = \frac{125 \text{ m}}{\Delta t}$$

$$\Delta t (18 \text{ m/s}) = 125 \text{ m}$$

$$\Delta t = \frac{125 \text{ m}}{18 \text{ m/s}}$$

$$\boxed{\Delta t = 6.9 \text{ s}}$$

16.  $\vec{a} = 3.2 \text{ m/s}^2$  [down] - 3.2 m/s<sup>2</sup>

$\Delta t = 8.0 \text{ s}$

$\vec{v}_2 = 28 \text{ m/s}$  [down] - 28 m/s

$\Delta d = ??$

down is neg

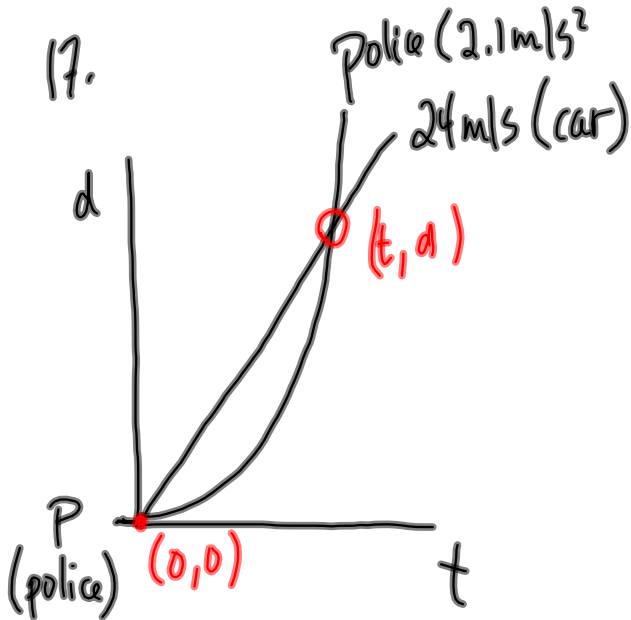
$$\Delta d = v_2 \Delta t - \frac{1}{2} a (\Delta t)^2$$

$$\Delta d = \left(-28 \frac{\text{m}}{\text{s}}\right)(8.0 \text{ s}) - \frac{1}{2} (-3.2 \text{ m/s}^2)(8.0 \text{ s})^2$$

$$\Delta d = -224 \text{ m} + 102.4 \text{ m}$$

$$\Delta d = -121.6 \text{ m}$$

$$\boxed{\vec{\Delta d} = 1.2 \times 10^2 \text{ m [down]}}$$



Car (constant velocity)

$$v = \frac{\Delta d}{\Delta t}$$

$$\Delta d = v \Delta t$$

$$d - 0 = (24 \text{ m/s})(t - 0)$$

$$\boxed{d = 24 \frac{\text{m}}{\text{s}} t}$$

$$24t = 1.05t^2$$

$$0 = 1.05t^2 - 24t$$

$$0 = t(1.05t - 24)$$

$$t = 0 \text{ and } 1.05t - 24 = 0$$

$$1.05t = 24$$

$$t = \frac{24 \text{ m/s}}{1.05 \text{ m/s}^2}$$

$$\boxed{t = 23 \text{ s}}$$

Police Car (constant acc)

$$\Delta d = v_i(\Delta t) + \frac{1}{2} a (\Delta t)^2$$

$$d = \frac{1}{2} (2.1 \text{ m/s}^2) t^2$$

$$\boxed{d = (1.05 \text{ m/s}^2) t^2}$$

$$d = (24 \text{ m/s}) t$$

$$d = (24 \text{ m/s})(23 \text{ s})$$

$$d = 548.57 \text{ m}$$

$$\boxed{d = 5.5 \times 10^2 \text{ m}}$$