

36. We denote the required time as  $t$ , assuming the light turns green when the clock reads zero. By this time, the distances traveled by the two vehicles must be the same.

(a) Denoting the acceleration of the automobile as  $a$  and the (constant) speed of the truck as  $v$  then

$$\Delta x = \left( \frac{1}{2}at^2 \right)_{\text{car}} = (vt)_{\text{truck}}$$

which leads to

$$t = \frac{2v}{a} = \frac{2(9.5)}{2.2} = 8.6 \text{ s} .$$

Therefore,

$$\Delta x = vt = (9.5)(8.6) = 82 \text{ m} .$$

(b) The speed of the car at that moment is

$$v_{\text{car}} = at = (2.2)(8.6) = 19 \text{ m/s} .$$