

69. We use Eq. 9-17, or – equivalently – we differentiate Eq. 9-5.

$$\begin{aligned}v_{\text{com}x} &= \frac{1}{M} ((1500 \text{ kg})(0 \text{ m/s}) + (4000 \text{ kg})v_{\text{truck}}) \\v_{\text{com}y} &= \frac{1}{M} ((1500 \text{ kg})v_{\text{car}} + (4000 \text{ kg})(0 \text{ m/s}))\end{aligned}$$

where  $M = 5500 \text{ kg}$ . From  $v_{\text{com}x} = (11) \cos 55^\circ = 6.3 \text{ m/s}$  and  $v_{\text{com}y} = (11) \sin 55^\circ = 9.0 \text{ m/s}$ , we get the following results for  $v_{\text{truck}}$  and  $v_{\text{car}}$  from the above formulas.

(a)  $v_{\text{car}} = 33 \text{ m/s}$ .

(b)  $v_{\text{truck}} = 8.7 \text{ m/s}$ .