

2/60 For B, $v_f - v_0 =$ area under $a-t$ curve

$$(65-25) \frac{44}{30} = 3.22t_1 + \frac{1}{2}(3.22)(5)$$

$$t_1 = 15.72 \text{ sec}$$

B reaches 65 mi/hr @ $15.72 + 5 = 20.7 \text{ sec} = t_2$

$$\begin{aligned} \text{Speed of B @ } t_1: v_1 &= 25\left(\frac{44}{30}\right) + 3.22(15.72) \\ &= 87.3 \text{ ft/sec} \end{aligned}$$

The acceleration history ($t_1 < t < t_2$) is $a = 13.34 - 0.644t$

$$\int_{v_1=87.3}^v dv = \int_{t_1=15.72}^t (13.34 - 0.644t) dt \text{ yields}$$

$$v = -42.9 + 13.34t - 0.322t^2$$

$$\text{Then } \int_{s_1}^{s_2} ds = \int_{t_1=15.72}^{t_2=20.7} (-42.9 + 13.34t - 0.322t^2) dt$$

$$\text{yields } (s_2 - s_1) = 463 \text{ ft}$$

Distance traveled by B in 20.7 sec

$$\begin{aligned} d_B &= 25\left(\frac{44}{30}\right)(15.72) + \frac{1}{2}(3.22)(15.72)^2 + 463 \\ &= 1437 \text{ ft} \end{aligned}$$