

2-1)

$x_i = 0$  (our choice of origin)

$x_f = ?$

$v_i = 8 \text{ m/s}$

$v_f = 17 \text{ m/s}$

$a = ?$

$t = 3 \text{ sec}$

a)  $a = (v_f - v_i) / t = (17 - 8) / 3 = +3 \text{ m/s}^2$

b) three approaches:

$$x = x_i + v_i t + \frac{1}{2} a t^2 = 0 + 8 \cdot 3 + \frac{1}{2} \cdot 3 \cdot 3^2 = 37.5 \text{ m}$$

or

$$v_f^2 = v_i^2 + 2a(x - x_i) \Rightarrow x = x_i + (v_f^2 - v_i^2) / (2a) = 0 + (17^2 - 8^2) / (2 \cdot 3) = 37.5 \text{ m}$$

or, even more directly,

$$\Delta x = v_{\text{ave}} \Delta t = \{[v_o + v_f] / 2\} t = \{[8 + 17] / 2\} 3 = 37.5 \text{ m} \quad (\text{This solution doesn't require knowing the acceleration first.})$$