

HW2-2 Soln)

Let the direction of motion be positive and start the problem at the origin. Then,

$$x_i = 0 \text{ m}$$

$$x_f = +20 \text{ m}$$

$$v_i = +40 \text{ m/s}$$

$$v_f = +18 \text{ m/s}$$

$$a = ? \leftarrow$$

$$t = ? \leftarrow$$

Let's try (4) first:

$$v_f^2 = v_i^2 + 2a(x - x_i)$$
$$a = \frac{v_f^2 - v_i^2}{2(x - x_i)} = \frac{18^2 - 40^2}{2(20 - 0)} = -31.9 \text{ m/s}^2$$

You're gonna need quite a set of tires to accomplish that!

Finish up with (1):

$$v_f = v_i + at$$
$$t = \frac{v_f - v_i}{a} = \frac{18 - 40}{-31.9} = 0.69 \text{ seconds} .$$