26. From Eq. 7-32, we see that the"area" in the graph is equivalent to the work done. We find the area in terms of rectangular [length×width] and triangular [$\frac{1}{2}$base×height] areas and use the work-kinetic energy theorem appropriately. The initial point is taken to be $x = 0$, where $v_0 = 4.0$ m/s.

(a) With $K_i = \frac{1}{2}mv_0^2 = 16$ J, we have

$$K_3 - K_0 = W_{0<x<1} + W_{1<x<2} + W_{2<x<3} = -4 \text{ J}$$

so that K_3 (the kinetic energy when $x = 3.0$ m) is found to equal 12 J.

(b) With SI units understood, we write $W_{3<x<x_f}$ as $F_x\Delta x = (-4)(x_f - 3.0)$ and apply the work-kinetic energy theorem:

$$\begin{aligned} K_{x_f} - K_3 &= W_{3<x<x_f} \\ K_{x_f} - 12 &= (-4)(x_f - 3.0) \end{aligned}$$

so that the requirement $K_{x_f} = 8$ J leads to $x_f = 4.0$ m.

(c) As long as the work is positive, the kinetic energy grows. The graph shows this situation to hold until $x = 1.0$ m. At that location, the kinetic energy is

$$\begin{aligned} K_1 &= K_0 + W_{0<x<1} \\ &= 16 + 2 \;=\; 18 \text{ J} . \end{aligned}$$