21. (a) The spring constant is $k = 1500$ N/m and the elongation is $x = 0.0076$ m. Our $+x$ direction is rightward. Using Eq. 7-26, the work is found to be

$$W = -\frac{1}{2}kx^2 = -\frac{1}{2}(1500)(0.0076)^2 = -0.043 \text{ J} .$$

(b) We use Eq. 7-25 with $x_i = x = 0.0076$ m and $x_f = 2x = 0.0152$ m to find the additional work:

$$\begin{aligned} W &= \frac{1}{2}k\left(x_i^2 - x_f^2\right) \\ &= \frac{1}{2}k\left(x^2 - 4x^2\right) \\ &= -\frac{3}{2}kx^2 \\ &= -\frac{3}{2}(1500)(0.0076)^2 = -0.13 \text{ J} . \end{aligned}$$

We note that this is greater (in magnitude) than the work done in the first interval (even though the displacements have the same magnitude), due to the fact that the force is larger throughout the second interval.