

25. According to the graph the acceleration a varies linearly with the coordinate x . We may write $a = \alpha x$, where α is the slope of the graph. Numerically,

$$\alpha = \frac{20 \text{ m/s}^2}{8.0 \text{ m}} = 2.5 \text{ s}^{-2} .$$

The force on the brick is in the positive x direction and, according to Newton's second law, its magnitude is given by $F = a/m = (\alpha/m)x$. If x_f is the final coordinate, the work done by the force is

$$W = \int_0^{x_f} F dx = \frac{\alpha}{m} \int_0^{x_f} x dx = \frac{\alpha}{2m} x_f^2 = \frac{2.5}{2(10)} (8.0)^2 = 800 \text{ J} .$$