

36. 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 $F = ma = m\alpha x$. If x_f is the final coordinate, the work done by the force is

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