## Solutions

Each answer shows the steps, then the **result**.

**2.1**

- $K = \frac{1}{2}(2)(5)^2 = 25$ J

**2.2**

- Four times (speed is squared)

**2.3**

- $v = \sqrt{2K/m} = \sqrt{2(12)/6} = \sqrt{4} = 2$ m s$^{-1}$

**2.4**

- No — mass and $v^2$ are never negative, so $K \geq 0$

**3.1 B**

- $K = \frac{1}{2}mv^2$

**3.2 C**

- $K \propto v^2$, so $3^2 = 9$

**3.3**

(a)

- $K = \frac{1}{2}(1500)(20)^2 = 3.0 \times 10^5$ J

(b)

- Four times larger, $1.2 \times 10^6$ J

**3.4**

(a)

- $v = \sqrt{2(10)/0.2} = \sqrt{100} = 10$ m s$^{-1}$

(b)

- No — $K$ is a scalar, independent of direction