

Solutions

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

2.1

- momentum:

$$p = mv = (5 \text{ kg})(3 \text{ m s}^{-1})$$

- $p = \mathbf{15 \text{ kg m s}^{-1}}$

2.2

- kg m s^{-1}

2.3

- moving left, so the velocity is negative:

$$p = mv = (2 \text{ kg})(-6 \text{ m s}^{-1})$$

- $p = \mathbf{-12 \text{ kg m s}^{-1}}$

2.4

- $p = mv$, rearranged for v :

$$v = \frac{p}{m} = \frac{24 \text{ kg m s}^{-1}}{4 \text{ kg}}$$

- $v = \mathbf{6 \text{ m s}^{-1}}$

3.1 B

- $p = mv$

3.2 C

- momentum is a vector

3.3

(a)

- momentum:

$$p = mv = (1200 \text{ kg})(15 \text{ m s}^{-1})$$

- $p = \mathbf{1.8 \times 10^4 \text{ kg m s}^{-1}}$

(b)

- East

3.4

(a)

- momentum of each, $p = mv$:

$$p_A = (8 \text{ kg})(3 \text{ m s}^{-1}) = \mathbf{24 \text{ kg m s}^{-1}}$$

$$p_B = (2 \text{ kg})(12 \text{ m s}^{-1}) = \mathbf{24 \text{ kg m s}^{-1}}$$

(b)

- neither: the momenta are equal