

Solutions

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

2.1

- The time of flight (both motions happen over the same time)

2.2

- Zero — there is no horizontal force

2.3

- $v = gt = 10 \times 2 = 20 \text{ m s}^{-1}$

2.4

- $\sqrt{6^2 + 8^2} = 10 \text{ m s}^{-1}$

3.1 C

- with no horizontal force, the horizontal velocity is constant

3.2 A

- the vertical motions are identical, so they land together

3.3

(a)

- $t = \sqrt{2h/g} = \sqrt{2(5)/10} = 1 \text{ s}$

(b)

- $x = v_x t = 10 \times 1 = 10 \text{ m}$

3.4

(a)

- $\sqrt{12^2 + 5^2} = 13 \text{ m s}^{-1}$

(b)

- $\tan^{-1}(5/12) = 23^\circ$ below the horizontal