Solutions

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

2.1

- $12 + 1.5 = 13.5$ m s^{-1} relative to the ground

2.2

- $25 - 18 = +7$ m s^{-1} (A ahead of B)

2.3

- Take one direction positive: $20 - (-20) = 40$ m s^{-1}

2.4

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

3.1 B

- velocity is defined relative to a reference frame

3.2 B

- $30 - 22 = 8$ m s^{-1}

3.3

(a)

- $\sqrt{2^2 + 1.5^2} = 2.5$ m s^{-1}

(b)

- The current carries the swimmer downstream while crossing

3.4

(a)

- Straight down

(b)

- A parabola — it keeps the train's forward velocity