# Review Questions
## ch 8 & ch 9 → MOTION

p. 375 # 2, 3, 4, 6-12, 14, 16

Answers

2. average velocity

3. m/s and km/h

4. $\vec{v}_{av}$ (average velocity) includes direction

   $v_{av}$ (average speed) is a scalar (no direction)

6. jogger A → $\vec{v}_{av} = \frac{\Delta \vec{d}}{\Delta t} = \frac{16}{4} = \boxed{4 \text{ m/s}}$

   jogger B → $\vec{v}_{av} = \frac{\Delta \vec{d}}{\Delta t} = \frac{12}{6} = \boxed{2 \text{ m/s}}$

   ↑ you may have selected different values but the answers are the same

7. a) $\vec{v} = 0$ (B)

   b) positive slope (A)

   c) $\vec{v}$ uniform [N] (A)

9. $\vec{v}_m = \frac{\Delta \vec{d}}{\Delta t} = \frac{0.25 \text{ m}}{150 \text{ s}} = 0.00167 \text{ m/s}$ (positive direction)

   (6 m/h)

8. $\vec{v}_m = \frac{\Delta \vec{d}}{\Delta t} = \frac{1.2 \text{ m}}{0.15 \text{ s}}$

10. $\Delta \vec{d} = \vec{v}_m \Delta t = 4.2 \text{ m/s} \times 25 \text{ s} = 105 \text{ m}$ [O]

11. $\Delta \vec{d} = \vec{v}_m \Delta t = 6.0\,m/s \times 12\,s = 72\,m$ [S]

12. $\Delta t = \frac{\Delta \vec{d}}{\vec{v}_m} = \frac{420\,m}{6.0\,m/s} = 70\,s$

14. $45\,km/h \times \frac{1000\,m/km}{3600\,s/h} = 12.5\,m/s$

or just $45\,km/h \div 3.6 = 12.5\,m/s$

16. $\Delta \vec{d} = \vec{v} \Delta t$ $\quad v = 42\,km/h \div 3.6 = 11.7\,m/s$

$= 11.7\,m/s \times 3\,s = 35\,m$ [forward]

p. 406 # 2, 4, 7, 8, 11, 12, 13, 14, 20

2. a) acceleration → the rate of change of velocity

b) we measure acceleration in $[m/s^2]$

4. a) The object is accelerating
↳ the velocity is getting faster & faster

b) The object will slow down

7. The slope of a velocity/time graph is <u>acceleration</u>

8. If the best fit line goes through all the points, the acceleration is constant.

11. With no air resistance, a brick & a $5 bill will have the same acceleration and will hit the ground at the same time

12. Near the surface of the Earth
$g = 9.8 m/s^2$ (in the direction of the centre of the Earth)

Usually we use $-9.8 m/s^2$ because it's in the downwards direction

13. $\Delta\vec{v} = \vec{v_f} - \vec{v_i} = 5 m/s - 9 m/s = -4 m/s$ [N]

14a) $v_f = 3$ m/s (E is positive)

$v_i = -5$ m/s (W is negative)

$\Delta \vec{v} = v_f - v_i$
$= 3\text{ m/s} - (-5\text{ m/s}) = 8\text{ m/s}$ [E]

b) Acceleration is in the opposite direction of the original direction or the acceleration is towards the east

20. $t = \frac{\Delta \vec{v}}{a} = \frac{56\text{ m/s} - 32\text{ m/s}}{3\text{ m/s}^2} = \frac{24\text{ m/s}}{3\text{ m/s}^2} = 8\text{ s}$