# Fully-worked Solutions

Formative Practice

1 Distance travelled
$$= 30 \times \frac{43}{60}$$
$$= 21.5 \text{ km}$$
Answer: **B**

2 (a) The lorry travels a distance of $\boxed{70}$ km in a time of 1 hour.

(b) The little child can walk a distance of 10 m in a time of $\boxed{1}$ minute.

(c) The bird flies for a distance of $\boxed{8}$ m in a time of $\boxed{1}$ s.

3 Bala, Yunus, Nasir, Elmi, Sukri, Chew

4 (a) Non-uniform speed

(b) Uniform speed

5 (a) Uniform speed. The motorcycle travels through a distance of 5 km in time intervals of 10 minutes.

(b) Non-uniform speed. The lorry travels through different distances in time intervals of 20 seconds.

6 (a) Uniform speed

(b) Non-uniform speed

7 (a) (i) Speed of taxi from taxi station to petrol kiosk
$$= \frac{200}{2}$$
$$= 100 \text{ km/h}$$

(ii) Speed from petrol kiosk to town
$$= \frac{120}{1.5}$$
$$= 80 \text{ km/h}$$

(b) No, the taxi is not travelling in uniform speed.

8 (a) Speed of tortoise
$$= \frac{90}{9}$$
$$= 10 \text{ cm/s}$$

(b) Speed of runner
$$= \frac{1.6 \text{ km}}{20 \text{ minutes}}$$
$$= 0.08 \text{ km/minute}$$
$$= 0.08 \times 60 \text{ km/h}$$
$$= 4.8 \text{ km/h}$$

9 (a) Distance travelled
$$= 15 \times 4$$
$$= 60 \text{ m}$$

(b) Distance travelled
$$= 70 \times \frac{90}{60}$$
$$= 105 \text{ km}$$

(c) Distance travelled
$$= 2 \times \frac{3}{4}(60)$$
$$= 90 \text{ km}$$

10 (a) Time taken
$$= \frac{418}{110}$$
$$= 3.8 \text{ hours}$$
$$= 3 \text{ hours } 48 \text{ minutes}$$

(b) Time taken
$$= \frac{320}{64}$$
$$= 5 \text{ hours}$$

(c) Time taken
$$= \frac{185}{74}$$
$$= 2\frac{1}{2} \text{ hours}$$

11 (a) Total time
$$= \frac{75}{50}$$
$$= 1.5 \text{ hours}$$

(b) Average speed
$$= \frac{72}{1.2}$$
$$= 60 \text{ km/h}$$

(c) Total distance
$$= 75 \times 2$$
$$= 150 \text{ km}$$

(d) Average speed
$$= \frac{126}{1.8}$$
$$= 70 \text{ km/h}$$

12 (a) $21 \text{ m/s} = \dfrac{21 \text{ m}}{1 \text{ s}}$
$$= \frac{\frac{21}{1\,000} \text{ km}}{\frac{1}{3\,600} \text{ h}}$$
$$= \frac{21}{1\,000} \times 3\,600 \text{ km/h}$$
$$= 75.6 \text{ km/h} \qquad [\checkmark]$$

(b) $42 \text{ cm/minute} = \dfrac{42 \text{ cm}}{1 \text{ minute}}$
$$= \frac{420 \text{ mm}}{60 \text{ s}}$$
$$= 7 \text{ mm/s} \qquad [\checkmark]$$

(c) $54 \text{ km/h} = \dfrac{54 \text{ km}}{1 \text{ h}}$

$\qquad = \dfrac{54\,000 \text{ m}}{3\,600 \text{ s}}$

$\qquad = 15 \text{ m/s}$ [✗]

(d) $800 \text{ m/minute} = \dfrac{800 \text{ m}}{1 \text{ minute}}$

$\qquad = \dfrac{0.8 \text{ km}}{\dfrac{1}{60} \text{ h}}$

$\qquad = 0.8 \times 60 \text{ km/h}$

$\qquad = 48 \text{ km/h}$ [✗]

13 Total distance travelled

$= 3\,800 + 2\,100 + 2\,500$

$= 8\,400 \text{ m}$

$= 8.4 \text{ km}$

Total time taken

$= 42 + 30 + 48$

$= 120 \text{ minutes}$

Average speed

$= \dfrac{8.4}{120}$

$= 0.07 \text{ km/minute}$

Average speed

$= \dfrac{8.4}{2}$

$= 4.2 \text{ km/h}$

14 (a) Distance of PQ

$= 90 \times 1\dfrac{1}{3}$

$= 120 \text{ km}$

Distance of PR

$= 120 + 80$

$= 200 \text{ km}$

(b) Total time taken from P to R

$= 1\dfrac{1}{3} + \dfrac{2}{3}$

$= 2 \text{ hours}$

Average speed

$= \dfrac{200}{2}$

$= 100 \text{ km/h}$

15

80 km/h →   200 km/h →

A X 80 km B
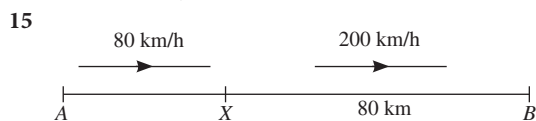
Distance of AX

$= 80 \times 0.5$

$= 40 \text{ km}$

Time taken to travel from X to B

$= \dfrac{80}{200}$

$= 0.4 \text{ h}$

Total distance travelled

$= 40 + 80$

$= 120 \text{ km}$

Total time taken

$= 0.5 + t + 0.4$

$= t + 0.9$

$\dfrac{120}{t + 0.9} = 60$

$120 = 60(t + 0.9)$

$120 = 60t + 54$

$66 = 60t$

$t = 1.1$

Answer: **A**

16 Acceleration

$= \dfrac{15 - 10}{20}$

$= \dfrac{5}{20}$

$= \dfrac{1}{4} \text{ m/s}^2$

Answer: **B**

17 (a) The speed of the chartered taxi increases 2 m/s in 1 s.

(b) The speed of the bicycle decreases 5 km/h in 1 minute.

18 (a) (i) Acceleration

$= \dfrac{(90 - 72) \text{ km/h}}{10 \text{ s}}$

$= \dfrac{18 \text{ km/h}}{10 \text{ s}}$

$= 1.8 \text{ km/h per second}$

(ii) Acceleration

$= \dfrac{(80 - 72) \text{ km/h}}{10 \text{ s}}$

$= \dfrac{8 \text{ km/h}}{10 \text{ s}}$

$= 0.8 \text{ km/h per second}$

The car in situation (i) travels with the higher acceleration.

(b) (i) Acceleration

$= \dfrac{24 - 20}{30}$

$= \dfrac{4}{30}$

$= \dfrac{2}{15} \text{ m/s}^2$

(ii) Acceleration

$= \dfrac{24 - 20}{15}$

$= \dfrac{4}{15} \text{ m/s}^2$

The car in situation (ii) travels with the higher acceleration.

19 (a) Acceleration

$$= \frac{9 - 5}{10}$$

$$= \frac{4}{10}$$

$$= 0.4 \text{ m/s}^2$$

(b) Acceleration

$$= \frac{4 - 12}{20}$$

$$= -\frac{8}{20}$$

$$= -0.4 \text{ m/s}^2$$

(c) Acceleration

$$= \frac{6 - 2}{5}$$

$$= \frac{4}{5}$$

$$= 0.8 \text{ m/s}^2$$

20 (a) Acceleration

$$= \frac{15 - 12}{10}$$

$$= \frac{3}{10}$$

$$= 0.3 \text{ m/s}^2$$

(b) Acceleration = 0

$$27 - u = 0$$

$$u = 27$$

(c) Acceleration = −300 km/h²

$$\frac{v - 88}{\frac{2}{60}} = -300$$

$$v - 88 = -300 \times \frac{2}{60}$$

$$v - 88 = -10$$

$$v = 78$$

(d) Acceleration = 45 m/minute²

$$\frac{120 - 105}{\frac{t}{60}} = 45$$

$$15 = 45 \times \frac{t}{60}$$

$$60 = 3t$$

$$t = 20$$

Summative Practice

1 A 150 m/minute

$$= \frac{150 \text{ m}}{60 \text{ s}}$$

$$= 2.5 \text{ m/s}$$

B 18 000 m/h

$$= \frac{18\,000 \text{ m}}{3\,600 \text{ s}}$$

$$= 5 \text{ m/s}$$

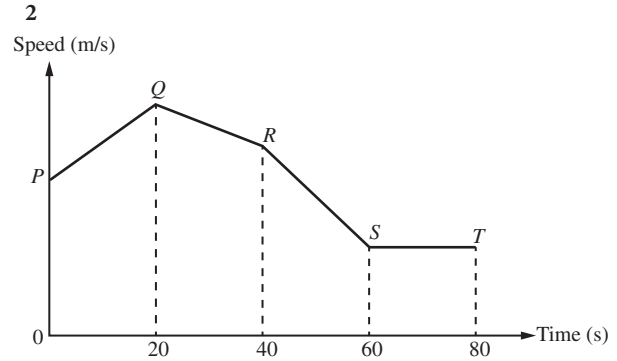**C** 7.2 km/h

$$= \frac{7\,200 \text{ m}}{3\,600 \text{ s}}$$

$$= 2 \text{ m/s}$$

D $\frac{9}{20}$ km/minute

$$= \frac{9\,000 \text{ m}}{20 \times 60 \text{ s}}$$

$$= 7.5 \text{ m/s}$$

Answer: **C**

2

Straight line *ST* represents uniform speed.

Answer: **D**

3 From *M* to *N*:

Time taken

$$= \frac{150}{50}$$

$$= 3 \text{ hours}$$

From *N* to *M*:

Time taken

$$= 3 - 0.5$$

$$= 2.5 \text{ hours}$$

Average speed

$$= \frac{150}{2.5}$$

$$= 60 \text{ km/h}$$

Answer: **A**

4 45 minutes = $\frac{45}{60}$ hour

Distance travelled

$$= 80 \times \frac{45}{60}$$

$$= 60 \text{ km}$$

Answer: **B**

5 108 km/h

$$= \frac{108 \times 1\,000 \text{ m}}{3\,600 \text{ s}}$$

$$= 30 \text{ m/s}$$

Acceleration

$$= \frac{0 - 30}{20}$$

$$= -1\frac{1}{2} \text{ m/s}^2$$

Answer: **A**

6 (a) 79 km/h, 85 km/h, 96 km/h, 112 km/h

(b) The speed of the car varies for the journey from *A* to *E*.

Therefore, the car is not travelling with uniform speed.

(c) Total distance travelled from A to E

$= 85 \times \dfrac{15}{60} + 112 \times \dfrac{15}{60} + 79 \times \dfrac{15}{60} + 96 \times \dfrac{15}{60}$

$= (85 + 112 + 79 + 96) \times \dfrac{15}{60}$

$= 372 \times \dfrac{15}{60}$

$= 93$ km

Total time taken to travel from A to E

$= 15 + 15 + 15 + 15$

$= 60$ minutes

$= 1$ hour

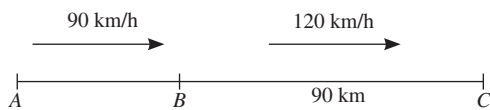Average speed

$= \dfrac{93}{1}$

$= 93$ km/h

7

(a) Distance between A and B

$= 90 \times 2\dfrac{2}{3}$

$= 240$ km

(b) Time taken to travel from B to C

$= \dfrac{90}{120}$

$= \dfrac{3}{4}$ hour

Total distance travelled from A to C

$= 240 + 90$

$= 330$ km

Total time taken to travel from A to C

$= 2\dfrac{2}{3} + \dfrac{35}{60} + \dfrac{3}{4}$

$= 4$ hours

Average speed of car from A to C

$= \dfrac{330}{4}$

$= 82.5$ km/h

8 (a) $\dfrac{u - 13}{8} = 1.5$

$u - 13 = 12$

$u = 25$

(b) $\dfrac{v - u}{18 - 8} = 0.9$

$\dfrac{v - 25}{10} = 0.9$

$v - 25 = 9$

$v = 34$