Fully-Worked Solutions

PRACTICE 9

Section A

1 Speed $= \frac{200 \text{ m}}{20.63 \text{ s}}$

$= 9.69 \text{ m s}^{-1}$

Ahmad wins because his time taken is shorter.

Answer: **C**

2 A straight line graph represents uniform speed.

Answer: **A**

3 The hand of clock moves an equal distance over equal time interval.

Answer: **D**

4 Speed $= \frac{174 \text{ km}}{2.5 \text{ h}}$

$= 69.6 \text{ km h}^{-1}$

Answer: **B**

5 $175 \text{ m/s} = \frac{175 \text{ m}}{1 \text{ s}}$

$= \frac{175 \div 1\,000 \text{ km}}{1 \div 60 \text{ min}}$

$= 10.5 \text{ km/min}$

Answer: **C**

6 Distance $= (28 \times 3 \times 60) \text{ m}$

$= 5\,040 \text{ m}$

$= \frac{5\,040}{1\,000} \text{ km}$

$= 5.04 \text{ km}$

Answer: **B**

7 Distance $=$ Speed $\times$ Time

$= 87 \times 2\frac{1}{3} \text{ km}$

$= 87 \times \frac{7}{3} \text{ km}$

$= 203 \text{ km}$

Answer: **D**

8 Time $= \frac{187 \text{ km}}{68 \text{ km/h}}$

$= 2.75 \text{ h}$

Answer: **C**

9 Time $= \frac{300}{80} \text{h}$

$= 3.75 \text{ h}$

Average speed $= \frac{300}{4.25} \text{ km/h}$

$= 70.59 \text{ km/h}$

Answer: **A**

10 Speed $= \frac{286 \text{ km}}{3.25 \text{ h}}$

$= 88 \text{ km/h}$

Answer: **B**

11 $96 \text{ km/h} = \frac{96 \text{ km}}{1 \text{ h}}$

$= \frac{96 \text{ km}}{60 \times 60 \text{ s}}$

$= \frac{2}{75} \text{ km/s}$

Acceleration $= \frac{\left(\frac{2}{75} - 0\right) \text{ km/s}}{8 \text{ s}}$

$= 0.00333 \text{ km/s}^2$

Answer: **A**

12 Acceleration $= \frac{18 - 8}{5}$

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

Answer: **D**

13 Acceleration $= \frac{0 - 24}{20}$

$= \frac{-24}{20} \text{ m/s}^2$

$= -1.2 \text{ m/s}^2$

Answer: **A**

14 Acceleration $= \frac{0 - 80 \text{ km/h}}{8 \text{ s}}$

$= -10 \text{ km/h per second}$

Deceleration $= 10 \text{ km/h per second}$

Answer: **C**

15 Acceleration $= \frac{105 - 65 \text{ km/h}}{15 \text{ min}}$

$= \frac{40 \text{ km/h}}{\frac{1}{4} \text{ h}}$

$= 160 \text{ km/h}^2$

Answer: **D**

16 Acceleration $= \frac{36 - 68 \text{ m/min}}{5 \text{ min}}$

$= -\frac{32}{5} \text{ m/min}^2$

$= -6.4 \text{ m/min}^2$

Deceleration $= 6.4 \text{ m/min}^2$

Answer: **B**

17 Acceleration $= \frac{12 - 0}{\frac{2}{3} \times 60 \text{ s}}$

$= \frac{12 \text{ m/s}}{40 \text{ s}}$

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

Answer: **A**

Section B

1 (a) ✗

(b) ✓

(c) ✓

(d) ✗

2 (a) A basketball is thrown into the basket.

(b) A cyclist cycles up a slope.

(c) The movement of the second hand of a stopwatch.

(d) The movement of an escalator.

- Uniform speed
- Non-uniform speed

3 (a) (i) $108 \text{ km/h} = \frac{108 \text{ km}}{1 \text{ h}}$

$= \frac{108 \times 1\,000 \text{ m}}{60 \text{ min}}$

$= 1\,800 \text{ m/min}$

(ii) $90 \text{ cm/s} = \frac{90 \text{ cm}}{1 \text{ s}}$

$= \frac{90 \div 100 \text{ m}}{1 \div 60 \text{ min}}$

$= 54 \text{ m/min}$

(b)

D = Distance
S = Speed
T = Time
$D = S \times T$

$S = \frac{D}{T}$

$T = \frac{D}{S}$

(i)	Distance = Speed × Time	✓
(ii)	$\text{Speed} = \frac{\text{Time}}{\text{Distance}}$	
(iii)	$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$	✓

4 (a) $680 \text{ m/min}^2 = \frac{680 \text{ m}}{1 \text{ min}^2}$

$= \frac{680 \div 1\,000 \text{ km}}{1 \text{ min}^2}$

$= 0.68 \text{ km/min}^2$

$96 \text{ km/h}^2 = \frac{96 \text{ km/h}}{1 \text{ h}}$

$= \frac{96 \text{ km/h}}{3\,600 \text{ s}}$

$= 0.0267 \text{ km/h per second}$

(b) (i) Deceleration: Speed decreases

(ii) Acceleration: Speed increases

Section C

1 (a) (i) Distance $= 18 \times 3 \times 60 \text{ m}$

$= 3\,240 \text{ m}$

$= (3\,240 \div 1\,000) \text{ km}$

$= 3.24 \text{ km}$

(ii) Time $= \frac{720 \text{ m}}{18 \text{ m/s}}$

$= 40 \text{ s}$

(b) (i) Distance $= 86 \text{ km/h} \times 1\frac{1}{2} \text{ h}$

$= 86 \times \frac{3}{2} \text{ km}$

$= 129 \text{ km}$

(ii) Total distance $= 129 + 129$

$= 258 \text{ km}$

Total time taken

$= 1.5 + 1.5 + 0.5$

$= 3.5 \text{ h}$

Average speed $= \frac{258 \text{ km}}{3.5 \text{ h}}$

$= 73.71 \text{ km/h}$

(c) Acceleration $= \frac{(75 - 90) \text{ km/h}}{15 \text{ min}}$

$= \frac{-15 \text{ km/h}}{\frac{15}{60} \text{ h}}$

$= -15 \times \frac{60}{15} \text{ km/h}^2$

$= -60 \text{ km/h}^2$

Deceleration $= 60 \text{ km/h}^2$

2 (a) (i) Acceleration $= -1.5 \text{ m/s}^2$

$\frac{0 - v}{8} = -1.5$

$-v = -1.5 \times 8$

$= -12$

$v = 12$

(ii) Distance $= v \times 10$

$= 12 \times 10$

$= 120 \text{ m}$

(b) Distance travelled in the first two hours

$= 75 \times 2$

$= 150 \text{ km}$

Remaining distance $= 348 - 150$

$= 198 \text{ km}$

Time taken (Second part) $= x$ hours

$1130 - 0615 = 515$

5 hours 15 min = 5.25 hours

$2 + 0.5 + x = 5.25$

$x = 5.25 - 2 - 0.5$

$= 2.75$

$$\text{Average speed} = \frac{198 \text{ km}}{2.75 \text{ h}}$$

$= 72$ km/h

(c) Car P:

$$\text{Time taken} = \frac{400 \text{ km}}{80 \text{ km/h}}$$

$= 5$ h

Car Q:

$$\text{Speed} = \frac{200 \text{ km}}{2 \text{ h}}$$

$= 100$ km/h

$$\text{Time taken} = \frac{400 \text{ km}}{100 \text{ km/h}}$$

$= 4$ h

Difference in time $= 5 - 4$

$= 1$ h