1

$$\frac{1.5^2}{\sqrt{\frac{1}{2} \times 21.5}} \approx 0.69 \ (1)$$

2

$$\frac{1}{2} \times 6.5 \times 2.5^2 \approx 20.31 \ (1)$$

3

$$\text{gradient} = \frac{\text{rise}}{\text{run}} = \frac{600}{6} \ (2)$$

$$\text{gradient} = 100 \ (1)$$

4

$$\text{resultant} = \sqrt{5^2 + 4^2} \ (2)$$

$$\text{resultant} = 6.4 \ (1)$$

5

$$120 \ \frac{\text{km}}{\text{h}} \times \frac{1000 \ \text{m}}{1 \ \text{km}} \times \frac{1 \ \text{h}}{60 \times 60 \ \text{s}} = 120 \times \frac{1000}{3600} = \frac{120}{3.6} = 33.3 \ \text{m s}^{-1} \ (1)$$

6

$$1 \ \frac{\text{m}}{\text{s}} \times \frac{1 \ \text{km}}{1000 \ \text{m}} \times \frac{60 \times 60 \ \text{s}}{1 \ \text{h}} = 1 \times \frac{3600}{1000} = 1 \times 3.6 = 3.6 \ \text{km h}^{-1} \ (1)$$

7

$$\text{speed} = \frac{\text{distance}}{\text{time}} = \frac{200}{25} \ (1)$$

$$\text{speed} = 8 \ \text{m s}^{-1} \ (1)$$

8

a distance $= 425\,\frac{m}{s} \times 1\,s = 425 \times 1\,m = 425\,m$ (1)

b distance $= 425\,\frac{m}{s} \times 1\,min = 425\,\frac{m}{s} \times 60\,s = 425 \times 60\,m$ (1)

distance $= 2550\,m$ (1)

c distance $= 425\,\frac{m}{s} \times 1\,h = 425\,\frac{m}{s} \times 60 \times 60\,s = 425 \times 3600\,m$ (1)

distance $= 1\,530\,000\,m$ (1)

9

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

so

$$\text{time} = \frac{\text{distance}}{\text{speed}}\,\frac{12\,m}{0.02\,\frac{m}{s}} = \frac{12}{0.02} = \;(1)$$

hence

time $= 600\,s$ (1)

10

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time}} = \frac{35\,m\,s^{-1}}{7\,s} = \frac{35}{7}\,m\,s^{-2} = 5\,m\,s^{-2}\;(1)$$

11.

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time}}$$

so

change in velocity $=$ acceleration $\times$ time

hence

a change in velocity $= 5\,\frac{m}{s^2} \times 1\,s = 5\,m\,s^{-1}$ (1)

b change in velocity $= 5\,\frac{m}{s^2} \times 5\,s = 25\,m\,s^{-1}$ (1)

c change in velocity $= 5\,\frac{m}{s^2} \times 30\,s = 150\,m\,s^{-1}$ (1)

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12.
a A (1)
b D (1)
c B (1)
d C (1)

Total Marks: **27**

Thresholds for intervention materials

Any student achieving below 60% or below in the Skills Check test will need to complete all the intervention lessons.

Any student achieving between 61% and 80% in the Skills Check test would probably benefit from completing all the intervention lessons.

Any student achieving above 80% may not need to complete the intervention lessons.

In all cases teachers may wish to assess the areas of weakness in the answers to the Skills Check tests and direct students to individual lessons as appropriate.