

## SUVAT Equations

$$V = U + at$$

Missing  
s

$$V^2 = U^2 + 2as$$

E

$$S = Ut + \frac{1}{2}at^2$$

V

$$S = vt - \frac{1}{2}at^2$$

U

$$S = \frac{(U+V)t}{2}$$

a

## Exercise 9c

2)

$$\begin{array}{ccc} & a & \\ \hline U = 10 \text{ ms}^{-1} & & V = 0 \text{ ms}^{-1} \\ t = 0.8 & & t = 1.6 \text{ s} \end{array}$$

U initial velocity

V final velocity

S displacement

a acceleration

t time

$$V = U + at$$

$$0 = 10 + 1.6a$$

$$-10 = 1.6a$$

$$-\frac{10}{1.6} = a$$

$$a = -\frac{5}{8} = -0.625 \text{ ms}^{-2}$$

$$\text{Deceleration} = 0.625 \text{ ms}^{-2}$$


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5)

$$\begin{array}{ccccc} A & \xrightarrow{24 \text{ m}} & B & & \\ t = 0 & & t = 6 & & \\ U & & V = 5 & & \end{array}$$

$$S = \frac{(U+V)}{2} t$$

4)

$$24 = \frac{(U+5)}{2} \times 6$$

$$8 = U + 5$$

$$\underline{u = 3 \text{ ms}^{-1}}$$

b)  $v = u + at$   
 $s = 3 + 6a$   
 $2 = 6a$   $a = \frac{1}{3} \text{ ms}^{-2}$   
 $\frac{2}{6} = a$

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7)  $72 \text{ km h}^{-1} = \frac{72 \times 1000}{3600} = 20 \text{ ms}^{-1}$

$$\begin{array}{c} A \quad a = -0.6 \text{ ms}^{-2} \\ \hline B \quad v \\ u = 20 \text{ ms}^{-1} \quad t = 25 \\ V = u + at \\ V = 20 - 0.6 \times 25 \\ V = 5 \text{ ms}^{-1} \\ V = 18 \text{ km h}^{-1} \end{array}$$

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5)  $s = \left( \frac{u+v}{2} \right) t = \left( \frac{20+5}{2} \right) \times 25 = 312.5 \text{ m}$

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9)

$$\begin{array}{l} v = 16 \text{ ms}^{-1} \\ A \\ \hline B \\ t = 40 \text{ s} \\ v = 0 \end{array}$$
$$\begin{array}{l} V = u + at \\ 0 = 16 + 40a \\ -16 = 40a \\ -\frac{16}{40} = a \\ a = -0.4 \text{ ms}^{-2} \end{array}$$

a) deceleration =  $0.4 \text{ ms}^{-2}$

$$b) s = \frac{(u+v)t}{2} = \frac{(16+0)}{2} \times 40 \\ = 320 \text{ m}$$


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ii)

$$a = 1.5 \text{ ms}^{-2}$$

$$12s \quad 10s$$

$$A \xrightarrow[u=1\text{ ms}^{-1}]{} B \xrightarrow[v=19\text{ ms}^{-1}, u=19]{} C \xrightarrow[v=43\text{ ms}^{-1}]{} 1.5 \text{ ms}^{-2}$$

$$v = u + at$$

$$v = 1 + 1.5 \times 12$$

$$a) \underline{v = 19 \text{ ms}^{-1}}$$

$$v = u + at$$

$$43 = 19 + 10a$$

$$24 = 10a$$

$$b) \underline{a = 2.4 \text{ ms}^{-2}}$$

$$s_1 = \frac{(u+v)t}{2}$$

$$s_1 = \frac{(1+19)}{2} \times 12$$

$$s_1 = 120 \text{ m}$$

$$s_2 = \frac{(u+v)t}{2}$$

$$= \frac{(19+43)}{2} \times 10$$

$$= 310 \text{ m}$$

$$S = s_1 + s_2$$

$$= 120 + 310$$

$$= 430 \text{ m}$$


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Homework Exercise 9C Even Numbers