Exercise 9D SUVAT

1)

A 8m B

$u = 3\,ms^{-1}$ v ?

$a = 2.5\,ms^{-2}$

$v^2 = u^2 + 2as$

$v^2 = 3^2 + 2 \times 2.5 \times 8$

$v^2 = 9 + 40$

$v^2 = 49$

$v = 7\,ms^{-1}$

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3)

A 36m B

$u = 12\,ms^{-1}$ $v = 0$

$v^2 = u^2 + 2as$

$0 = 12^2 + 2 \times a \times 36$

$0 = 12^2 + 72a$

$-144 = 72a$

$-\frac{144}{2} = a$

$a = -2\,ms^{-2}$ deceleration $= 2\,ms^{-2}$

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5)

48m

a) A B

$u = 4\,ms^{-1}$ $B = 16\,ms^{-1}$

$v^2 = u^2 + 2as$

$16^2 = 4^2 + 2 \times 48 \times a$

$256 = 16 + 96a$

$240 = 96a$

$\frac{240}{96} = a$ $\qquad$ $a = 2.5\,ms^{-2}$

b)

$v = u + at$

$16 = 4 + 2.5t$

$12 = 2.5t$

$\frac{12}{2.5} = t$

$t = 4.8\,s$

7)

A $\qquad$ s $\qquad$ B

a)

$u = 18\,ms^{-1}$ $\qquad$ $v = 0$ $\qquad$ $a = -3\,ms^{-2}$

$v^2 = u^2 + 2as$

$0 = 18^2 - 6s$

$6s = 324$

$s = 54\,m$

b)

$v = u + at$

$0 = 18 - 3t$

$3t = 18$

$t = 6\,s$

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11)

O $\qquad$ 8m $\qquad$ A

$u = 12\,ms^{-1}$ $\qquad$ t $\qquad$ $a = -5\,ms^{-2}$

$s = ut + \frac{1}{2}at^2$

$$8 = 12t - 2.5t^2$$

$$2.5t^2 - 12t + 8 = 0$$

By calc $\quad t = 4 \quad , \quad t = 0.8$

$t = 0.8\,s$ and $t = 4\,s$

b)

$$v^2 = u^2 + 2as$$

$$v^2 = 12^2 - 10(-8)$$

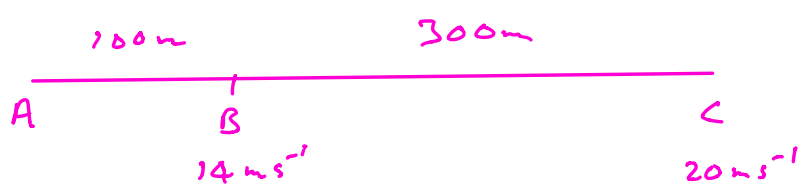
$$v^2 = 144 + 80$$

$$v^2 = 224$$

$$v = \pm 15.0\ ms^{-1}$$

$$v = -15.0\ ms^{-1}$$

13)



BC

$$v^2 = u^2 + 2as$$

$$20^2 = 14^2 + 2 \times 300 \times a$$

a)

$$400 = 196 + 600a$$

$$\frac{204}{600} = a \qquad a = 0.34\ ms^{-2}$$

b)

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

AC

$$400 = 20t - 0.17t^2$$

$$0.17t^2 - 20t + 400 = 0$$

$$\cancel{t = 92.1\,s} \qquad \underline{t = 25.5\,s}$$

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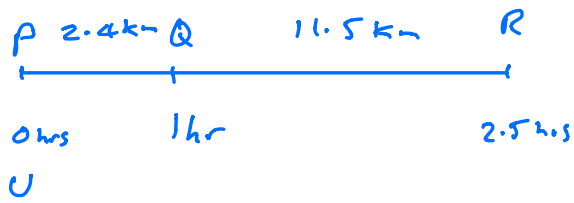
15)



PQ $\quad s = ut + \frac{1}{2}at^2$

$$2.4 = u \times 1 + \frac{1}{2}a(1)^2$$

$$\underline{2.4 = u + \frac{1}{2}a} \qquad (1)$$

PR $\quad s = ut + \frac{1}{2}at^2$

$$13.9 = 2.5u + \frac{1}{2}a(2.5)^2$$

$$\underline{13.9 = 2.5u + 3.125a} \qquad (2)$$

$$u = \frac{22}{75} \qquad 0.293 \text{ km/h}$$

$$a = \frac{316}{75} \qquad 4.21 \text{ km/h}^2$$

Homework Exercise 9D even numbers