

Question	Scheme	Marks	AOs
2(a)	$\frac{10}{4}$	M1	3.4
	2.5, $\frac{5}{2}, \frac{10}{4} \text{ m s}^{-2}$ units needed.	A1	1.1b
		(2)	
2(b)	Find the area, with correct structure, from $t = 0$ to 18	M1	3.1b
	$\frac{1}{2} \times 4 \times 10 + (14 \times 10)$ triangle + rectangle or $\frac{1}{2} \times 10 \times (14 + 18)$ trapezium or $(18 \times 10) - \frac{1}{2} \times 4 \times 10$ rectangle – triangle N.B. $\frac{1}{2} \times 4 \times 10$ may be replaced by $\frac{1}{2} \times 2.5 \times 4^2$ using $s = ut + \frac{1}{2}at^2$ or by $\frac{10^2 - 0^2}{2 \times 2.5}$ using $v^2 = u^2 + 2as$	A1	1.1b
	160 (m)	A1	1.1b
		(3)	
2(c)	Using area, from $t = 18$ to $t = 24$, = (200 – their (b)) with correct structure OR $s = (200 - \text{their (b)})$, using <i>suvat</i> to find s N.B. If their (b) is incorrect and they don't use it, allow a correct restart.	M1	3.1b
	$6U + \frac{1}{2} \times 6 \times (10 - U) = 200 - \text{their (b)}$ rectangle + triangle or $\frac{1}{2} \times 6 \times (10 + U) = 200 - \text{their (b)}$ trapezium ($s = \left(\frac{u+v}{2}\right)t$) or $(6 \times 10) - \frac{1}{2} \times 6 \times (10 - U) = 200 - \text{their (b)}$ rectangle – triangle or $(10 \times 6) + \frac{1}{2} \left(-\frac{(10-U)}{6}\right) \times 6^2 = 200 - \text{their (b)}$ $s = ut + \frac{1}{2}at^2$ or $(U \times 6) - \frac{1}{2} \left(-\frac{(10-U)}{6}\right) \times 6^2 = 200 - \text{their (b)}$ $s = vt - \frac{1}{2}at^2$ N.B. Two stage <i>suvat</i> method: $(10 \times 6) + \frac{1}{2}a \times 6^2 = 200 - \text{their (b)} \Rightarrow$ AND $U = 10 + 6 \times \text{their } a$	A1ft	1.1b

		$\frac{10}{3} = 3\frac{1}{3}$ oe	A1	1.1b
			(3)	
(8 marks)				
Notes:				
2a	M1	Any complete <i>suvat</i> method to find <i>a</i> e.g. use $s = 20$ and $20 = \frac{1}{2}a \times 4^2$ N.B. Ignore units at this stage		
	A1	Any equivalent number with correct units. Accept m/s^2 , m/s/s , m per s per s .		
2b	M1	Complete method, they may use <i>suvat</i> on one or more sections, to find the TOTAL area. M0 if a single <i>suvat</i> equation is used for the whole motion M0 if $\frac{1}{2}$ not seen used in an area method		
	A1	Correct unsimplified expression.		
	A1	cao. Ignore units. N.B. Correct answer, with no working , can score all 3 marks.		
2c	M1	Complete method, using area or <i>suvat</i> , to give an equation in <i>U</i> only, with correct structure M0 if $\frac{1}{2}$ not seen used in an area method M0 if 10 is used instead of $(10 - U)$ or $(10 - U)$ is used instead of $(10 + U)$ in any equation		
	A1ft	Correct unsimplified equation in <i>U</i> only (allow <i>V</i> or <i>v</i> instead of <i>U</i>), ft on their 160 .		
	A1	Accept 3.3 or better. Ignore units. Allow use of <i>V</i> throughout instead of <i>U</i> , <u>including in the answer</u> . N.B. Correct answer, with no working , can score all 3 marks.		