

Question Number	Scheme	Marks
<b>4(a)</b>	$\sum_{r=1}^n (3r-4) = 3 \sum_{r=1}^n r - 4n$ $= 3 \times \frac{n}{2}(1+n) - 4n \quad \text{or} \quad = 3 \times \frac{n}{2}(2 + (n-1) \times 1) - 4n$ $= \frac{n}{2}(3n-5) \quad *$	M1 A1 A1 (3)
<b>(b)</b>	$\sum_{r=11}^{50} (3r-4) = \sum_{r=1}^{50} (3r-4) - \sum_{r=1}^{10} (3r-4)$ $= \frac{50}{2}(3 \times 50 - 5) - \frac{10}{2}(3 \times 10 - 5) = 3500$	M1 A1 (2)
<b>(c)</b>	$\frac{n}{2}(3n-5) = 186$ $3n^2 - 5n - 372 = 0$ $(3n+31)(n-12) = 0 \quad \text{or formula}$ $n = 12$	M1 M1dep A1 (3) [8]
<b>5(a)</b>	$v = 0 = 5 \cos 2t$ $\cos 2t = 0 \quad t = \frac{\pi}{4} \quad (= 0.7853...) \text{ s}$	M1A1 (2)
<b>(b)</b>	$a = \frac{dv}{dt} = -10 \sin 2t$ $\text{mag } a_{\max} = 10 \text{ m/s}^2$	M1 M1depA1 (3)
<b>(c)</b>	$v = 5 \cos 2t$ $s = \int 5 \cos 2t \, dt$ $s = \frac{5}{2} \sin 2t (+c)$ $t = 0, s = 2 \Rightarrow c = 2$ $t = \frac{\pi}{4} \quad s = 2.5 + 2 = 4.5 \text{ m}$	M1A1 M1dep A1 (4) [9]