Question	Scheme	Marks
5(a)	$\frac{\mathrm{d}v}{\mathrm{d}t} = 4t - 19$ $\frac{\mathrm{d}v}{\mathrm{d}t} = 4\times 5 - 19 = 1\left(\mathrm{m/s^2}\right)$	M1 A1 [2]
(b)	$2t^2 - 19t + 35 = 0 \Rightarrow (2t-5)(t-7) = 0 \Rightarrow t = \frac{5}{2}, 7$ $t_1 = \frac{5}{2} \quad t_2 = 7$	M1 A1 [2]
(c)	$D = \int_{\frac{5}{2}}^{7} \left(2t^2 - 19t + 35\right) \mathrm{d}t = \left[\frac{2t^3}{3} - \frac{19t^2}{2} + 35t\right]_{\frac{5}{2}}^{7}$ $\left(\frac{2\times 7^3}{3} - \frac{19\times 7^2}{2} + 35\times 7\right) - \left(\frac{2\times 2.5^3}{3} - \frac{19\times 2.5^2}{2} + 35\times 2.5\right)$ $= \left[\frac{49}{6} - \frac{925}{24}\right] = \left[8.167 - 38.542\right] = \left[-\frac{243}{8} \text{ or } -30.375\right]$ $\Rightarrow D = \frac{243}{8}$ (m) oe e.g. 30.375	M1 M1 A1 [3]
		Total 7 marks

Part	Mark	Notes
(a)	M1	For differentiating the given v and substituting in $t = 5$ into the derivative. Both differentiation and substitution must be correct for this mark.
	A1	For the correct acceleration of 1 m/s^2. Units are not required.
(b)	M1	For attempting to solve the given 3TQ for the velocity. A correct method must be used, and they must reach **two** values of t for the award of this mark. See General Guidance for the definition of an attempt to solve a 3TQ. If there is no visible method seen, both values of t must be seen for the award of this mark.
	A1	For the two correct values of t They do not need to ne identified as t_1 or t_2 for this mark. Accept $\frac{5}{2}$ and 7 seen.
(c)	M1	For an attempt to integrate the given expression for v. At least one term must be correct and no terms are to be differentiated. If the value of 35 'disappears' it is M0. The question states 'use calculus' so integration must be seen.
	M1	For substituting the **two** values of t into their integrated expression. and subtracting the result (either way) of both substitutions. Allow for any changed expression from v A correct answer of $\pm\frac{243}{8}$ or ± 30.375 implies correct substitution into a correct integral. If the integration is incorrect, or the values are incorrect, full correct substitution must be seen for the award of this mark.
	A1	For the correct distance (which must be a positive value).