

5	(a)	<p>Maximum speed of the car or model will show consumption eventually becoming negative or model may not apply for above 80 mph</p>	<p>B1 [1]</p>	<p>or, eg, doesn't drive faster than 80, or speed limit Condone eg "Maximum number of miles car can drive"</p>
5	(b)	<p>$\frac{d}{dv} \left(\frac{12}{5}v - \frac{3}{125}v^2 \right) = 0 \quad (\Rightarrow \frac{12}{5} - \frac{6v}{125} = 0)$ $v = 50$ $\frac{d^2}{dv^2} \left(\frac{12}{5}v - \frac{3}{125}v^2 \right) = -\frac{6}{125}$ when $v = 50$ or any correct method showing that SP is a maximum Maximum speed is 50 mph</p>	<p>M1 A1 M1 A1</p>	<p>Attempt differentiate C & equate to 0 Must be correct Units essential. Dep only on 1st M1</p>

5	(b) ctd	<p>Alternative method 1</p> $v = -\frac{b}{2a} \left(= -\frac{\frac{12}{5}}{\frac{2 \times (-3)}{125}} \right) \text{ Attempt complete square}$ <p>$v = 50$ Coefficient of v^2 negative, hence stationary point is a maximum Maximum speed is 50 mph</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Units essential</p>
		<p>Alternative method 2</p> $\frac{12}{5}v - \frac{3}{125}v^2 = 0 \quad (v = 0 \text{ or } 100) \ \&$ <p>Correct sketch graph & $v = 50$ $v = 50$ seen on graph as giving maximum Maximum speed is 50 mph</p>	<p>M1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>[4]</p>	<p>Working must be seen</p> <p>NB. This mark can be gained without working to justify the graph.</p> <p>Units essential</p>
5	(c)	<p>$v = 0$ does not give $C = 0$ oe</p>	<p>B1</p> <p>[1]</p>	<p>They will not consume fuel at 0 mph oe</p>
5	(d)	<p>eg $k\left(\frac{12}{5}v - \frac{3}{125}v^2\right)$ with any $k > 1$</p>	<p>B1</p> <p>B1</p>	<p>or "Increase both constants by the same factor" B1B1</p> <p>or with numerical value of $k (> 1)$ B1B1</p> <p>SC: "Increase both constants" B1B0</p>
		<p>Alternative method</p> <p>eg $(1 + k)\left(\frac{12}{5}v - \frac{3}{125}v^2\right)$ where $k > 0$</p>	<p>B1</p> <p>B1</p>	
			<p>[2]</p>	