Question Number	Scheme	Marks
1 (a)	$y = 2x^2(x-5) = 2x^3 - 10x^2$	B1
	$\frac{dy}{dx} = 6x^2 - 20x$	M1
	Sets $\frac{dy}{dx} = 0 \Rightarrow 6x^2 - 20x = 0 \Rightarrow x = 0, \frac{10}{3}$ oe	dM1 A1 **(4)**
(b)	$x \leqslant 0, \quad x \geqslant \frac{10}{3}$	M1 A1 **(2)** **(6 marks)**
Alt (a)	$\left(\frac{d(uv)}{dx} = uv' + vu'\right) \qquad u = 2x^2, u' = 4x, v = x-5, v' = 1$	B1
	$\left(\frac{dy}{dx} =\right) Ax(x-5) + Bx^2$	M1
	Sets $\frac{dy}{dx} = 0 \Rightarrow 4x(x-5) + 2x^2 = 0 \Rightarrow x = 0, \frac{10}{3}$	dM1 A1

(a)

B1 Expands to a correct form $\left(y =\right)\ 2x^2(x-5) = 2x^3 - 10x^2$

(may be implied by sight of $\frac{dy}{dx} = 6x^2 - 20x$)

If a candidate uses the product rule then award this mark for correct terms for *u*, *u'*, *v* and *v*' stated or implied.

M1 Differentiated reducing a power by one on one of their terms.

If a candidate uses the product rule then look for $\left(\frac{dy}{dx} =\right) Ax(x-5) + Bx^2$. (Do not award for just differentiating the factor in front of the bracket and the $x-5$)

dM1 $\frac{dy}{dx} = 0$ and solves a quadratic equation to find at least one solution. (Usual rules for solving a quadratic). Values such as 0 and 3.33 to imply this mark.

It is dependent on the previous method mark. Dividing by x to find one of the solutions is also acceptable for this mark.

Allow answers to be just written down but you may need to check these on your calculator.

A1 $x = 0, \frac{10}{3}$ oe (Must be seen in (a)

Allow if embedded within pairs of coordinates for the stationary points of C
SC If no calculus work shown then 0001 for achieving the correct *x* coordinates.

SC If no credit worthy work seen in (a) but they use calculus in (b) then B1M1M1 can be awarded but withhold the A mark.

(b) Note we are now marking this on epen as M1A1

M1 One of $x \leq "0"$ or $x \geq "\frac{10}{3}"$. Allow for $x < "0"$ or $x > "\frac{10}{3}"$.

They must have only achieved a maximum of two *x* coordinates in (a).
Do not award for inequalities using solutions from $y = 0$ or if they have integrated instead.

A1 Both $x \leq 0, x \geq \frac{10}{3}$. Allow both $x < 0, x > \frac{10}{3}$. Ignore any joining statements such as "and", "or" or any set notation eg. $\cup$ or $\cap$ and allow statements such as $(-\infty, 0], \left[\frac{10}{3}, \infty\right)$. $\frac{10}{3}$ does not need to be in its lowest terms. Isw after two correct inequality statements unless they contradict. (Eg ignore after two correct inequalities $x < 0, x > \frac{10}{3}$ a statement such as $0 > x > \frac{10}{3}$ but withhold the final mark if they subsequently write $0 < x < \frac{10}{3}$)

Question Number	Scheme	Marks
2 (a)	States or uses $r = 1.02$	B1
	Attempts $25000 \times 1.02^{13} = 32340$ or 32341 or 32300	M1 A1
		(3)
(b)	Attempts $\frac{a\left(r^n - 1\right)}{\left(r - 1\right)} = \frac{25000\left(1.02^{14} - 1\right)}{1.02 - 1}$ or $\frac{125000\left(1.02^{14} - 1\right)}{1.02 - 1}$	M1 A1
	£1 997 000	A1
		(3)
		(6 marks)

(a)

B1 States or uses $r = 1.02,\ 102\%,$ (1+2%) oe

M1 Attempts $25000 \times "r"^{12}$ or $25000 \times "r"^{13}$. Allow eg $r = 2$ for this mark. They may show the increase each year which is acceptable. Expect to see at least one correct increase for their *r* and attempting 12 or 13 increases by the same percentage. Allow a misread if 2500 or 250000 is used instead.
Awrt 31706 which is 25000×1.02^{12} is usually sufficient evidence for this mark.

A1 32340 (or 32341). Must be an integer. Allow 32300 which is the answer rounded to 3sf.

(b)

M1 Attempts $\frac{a(r^n - 1)}{r - 1}$ or $\frac{a(1 - r^n)}{1 - r}$ with $a = 25000$ or 125000, $n = 13$ or 14 and $r = 1.02$ or their *r* from part (a).

A1 For $\frac{25000(1.02^{14} - 1)}{1.02 - 1}$ or $\frac{125000(1.02^{14} - 1)}{1.02 - 1}$ or equivalent. Awrt 1 997 000 implies this mark.

A1 1 997 000 only

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Alt(b)

M1 If they attempt to add year by year then look for 13 or 14 values being added with the first year 25000 and at least one increase year to year of 2% or their *r*.

A1 All 14 values seen or implied from either column 2 or 3 of the table on the next page. Allow values to be truncated or rounded to 3 significant figures. Awrt 1 997 000 also implies this mark.

A1 1 997 000 only