A1 $10\sqrt{2}+10$ or $10+10\sqrt{2}$ only. It cannot be awarded without sight of the correct intermediate line seen above

Question Number	Scheme	Marks
3.(a)	Attempts perimeter of garden = $2\times5x+2\times(6x-2)$	M1
	Sets $2\times5x+2\times(6x-2)>29\Rightarrow22x>33$	dM1
	$\Rightarrow x>\frac{33}{22}\Rightarrow x>1.5$ *	A1*
		(3)
(b)	Attempts area of garden = $2x(2x-1)+3x(6x-2)$	M1
	Sets $A<72\Rightarrow 22x^2-8x-72<0$	A1
	Finds critical values $11x^2-4x-36\Rightarrow x=-\frac{18}{11},2$	M1
	Chooses inside region	ddM1
	$-\frac{18}{11}<x<2$	A1
		(5)
(c)	$1.5<x<2$	B1
		(1)
		(9 marks)

(a)

M1 An attempt at finding the perimeter of the garden.
Scored for sight of $5x+2x-1+2x+6x-2+$ additional term(s) involving x
Individual lengths may not be seen so imply for sight of a total of $ax+b$, where $a>15$

dM1 Sets their $P>29$ and attempts to solve by proceeding to $ax>c$
You may condone an attempt in which $P=29\Rightarrow ax=c$

A1* cso with at least one correct intermediate (simplified) line $22x>33$ or $x>\frac{33}{22}$ before $x>1.5$ seen.
Condone an attempt in which you see $P=29\Rightarrow x=1.5$ before $x>1.5$ seen
Note that it is possible to start with $x>1.5$ and prove $P>29$ but for the A1* to be scored there must be a final statement of the type "hence $x>1.5$". There is no requirement for any units

(b) **Mark part (b) and (c) together**

M1 For an attempt at finding the area of the garden. For this to be scored look for
The sum of two areas $2x(2x-1)+...x(6x-2)$ condoning slips
The sum of two areas $5x(2x-1)+...x(..x\pm...)$ condoning slips
The difference between two areas $5x(6x-2)-2x(..x\pm...)$ condoning slips.

A1 A "correct and simplified" equality or inequality, condoning $<\leftrightarrow\leqslant\leftrightarrow=$ Eg. $22x^2-8x-72<0$ oe

M1 A valid attempt to find the critical values of their 3TQ. Allow factorisation, formula, completion of square or use of calculator. If a calculator is used then the answer(s) must be correct for their 3TQ. Condone candidates who fail to state the negative root of their quadratic.

ddM1 Dependent upon both M's. For choosing the inside region for their critical values. Condone $<\leftrightarrow\leqslant$
Condone for this mark replacing a negative root with 0, 0.5 or 1.5. So accept for example one of either $1.5<x<"2"$, $0<x<"2"$ or $0.5<x<"2"$

A1 $-\frac{18}{11}<x<2$ Allow $0<x<2$ or $0.5<x<2$ due to context. Allow alternative notation. See below

(c)

B1 $1.5 < x < 2$. Accept versions such as $(1.5, 2)$, $x > 1.5$ **and** $x < 2$, $x > 1.5 \cap x < 2$

Do not allow $x > 1.5$ or $x < 2$ $x > 1.5,\ x < 2$

Question Number	Scheme	Marks
4.	$\frac{4x^2+1}{2\sqrt{x}} = \frac{4x^2}{2\sqrt{x}} + \frac{1}{2\sqrt{x}} = 2x^{\frac{3}{2}} + \frac{1}{2}x^{-\frac{1}{2}}$	M1 A1
	$\int \frac{4x^2+1}{2\sqrt{x}}\,dx = \frac{4}{5}x^{\frac{5}{2}} + x^{\frac{1}{2}} + c$	M1 A1 A1 **(5 marks)**

M1 Attempts to write $\frac{4x^2+1}{2\sqrt{x}}$ as a **sum of two terms**.

Award if any index is correct and processed for a form $Px^m + Qx^n$

Do not allow if the indices are un processed Eg. $\frac{x^2}{\sqrt{x}} = x^{2-\frac{1}{2}}$

A1 $2x^{\frac{3}{2}} + \frac{1}{2}x^{-\frac{1}{2}}$ oe. The coefficients do not have to be simplified. Condone $\frac{4x^{\frac{3}{2}} + x^{-\frac{1}{2}}}{2}$ for M1 A1

M1 Raises the power of one **correct** index by one.

The index must be processed correctly so award for sight of $\rightarrow ...x^{\frac{5}{2}}$ or $...x^{\frac{1}{2}}$

A1 For one correct term and in simplest form. Either $+\frac{4}{5}x^{\frac{5}{2}}$ or $+x^{\frac{1}{2}}$

A1 Fully correct $\frac{4}{5}x^{\frac{5}{2}} + x^{\frac{1}{2}} + c$. Accept exact equivalent simplified answers such as $0.8x^2\sqrt{x} + \sqrt{x} + c$

Condone spurious notation such as $\int$ or a dx

Condone $\frac{4}{5}x^{\frac{5}{2}} + 1x^{\frac{1}{2}} + c$