(b)	$x=\frac{1}{4}\Rightarrow \frac{\mathrm{d}y}{\mathrm{d}x}=12\times\frac{1}{4}+\frac{3}{2}\times\sqrt{\left(\frac{4}{1}\right)}=...\left(6\right)$	M1
	$\left(\frac{1}{4},\frac{5}{2}\right)\Rightarrow y-\frac{5}{2}="6"\left(x-\frac{1}{4}\right)$ or e.g. $y="6"x+c\Rightarrow\frac{5}{2}=6\times\frac{1}{4}+c\Rightarrow c=...$	**d**M1
	$\Rightarrow y=6x+1$	A1
		(3)
		(6 marks)

Notes

(b)

M1: Substitutes $x=\frac{1}{4}$ into their $\frac{\mathrm{d}y}{\mathrm{d}x}$ and finds its value. Their $\frac{\mathrm{d}y}{\mathrm{d}x}$ cannot be the same as "y".

Score for sight of $x=\frac{1}{4}$ substituted consistently into their $\frac{\mathrm{d}y}{\mathrm{d}x}$ followed by a value **or** it may be implied by a correct value for their $\frac{\mathrm{d}y}{\mathrm{d}x}$ if no substitution is seen.

Condone a miscopy of their $\frac{\mathrm{d}y}{\mathrm{d}x}$ if the intention is clear.

Do **not** award this mark for work such as

$$\left(\frac{\mathrm{d}y}{\mathrm{d}x}\right)=12x+\frac{3}{2}x^{-\frac{1}{2}}+c=12\left(\frac{1}{4}\right)+\frac{3}{2}\left(\frac{1}{4}\right)^{-\frac{1}{2}}+c=0\left(\text{or}\frac{5}{2}\right)\Rightarrow c=...$$

dM1: Correct method for finding the equation of the tangent (not the normal). Look for the correct use of their non-zero $\frac{\mathrm{d}y}{\mathrm{d}x}$ at $x=\frac{1}{4}$ and the point $\left(\frac{1}{4},\frac{5}{2}\right)$ with the values correctly placed.

If the form $y=mx+c$ is used they must proceed as far as $c=...$ e.g. $\frac{5}{2}="6"\frac{1}{4}+c\Rightarrow c=...$

Depends on the first method mark.

A1: $y=6x+1$ Cso

Note if they do not use part (a) for part (b) e.g. just use a calculator they will need to obtain a gradient of 6 for the first mark, then apply the scheme.

Question Number	Scheme	Marks
2.	$\int (x-3)^2(2x+5)\,\mathrm{d}x$	
	$(x-3)^2(2x+5)=\left(x^2-6x+9\right)(2x+5)=...$ or e.g. $(x-3)^2(2x+5)=(x-3)\left(2x^2-x-15\right)=...$	M1
	$=2x^3-7x^2-12x+45$	A1
	$\int (x-3)^2(2x+5)\,\mathrm{d}x=\frac{1}{2}x^4-\frac{7}{3}x^3-6x^2+45x+c$	M1 A1ft A1
		(5 marks)

Notes

M1: Attempts to multiply out. Look for an attempt to multiply two brackets together to form a quadratic before the result is combined with the third bracket.
Condone slips e.g. $(x-3)^2=x^2\pm 9$ and it may be left unsimplified but it must lead to an expression that could be simplified to the form ax^3+bx^2+cx+d where $a,b,c,d\neq 0$
Condone an answer appearing without an intermediate step only if it is of the form (or can be expressed in the form) $2x^3+px^2+qx\pm 45$ where $p,q\neq 0$

A1: For $2x^3-7x^2-12x+45$ but allow this unsimplified with the terms uncollected e.g. $2x^3+5x^2-12x^2-30x+18x+45$ and award this mark as soon as a correct expression is seen. Inclusion of "+ c" here scores A0 but the final mark is still available.

So $(x-3)^2(2x+5)=2x^3-7x^2-12x+45+c$ is A0 but

$\int (x-3)^2(2x+5)\,\mathrm{d}x=\int\left(2x^3-7x^2-12x+45\right)\mathrm{d}x+c$ is ok for A1

M1: For an attempt to integrate any 2 terms with **different powers** of their simplified or unsimplified expression by increasing the power of x by 1 following an attempt to expand all 3 brackets.
It is for any 2 of, $...x^3\rightarrow ...x^4$, $...x^2\rightarrow ...x^3$, $...x\rightarrow ...x^2$, $k\rightarrow kx$
Allow indices to be unprocessed e.g. $...x^3\rightarrow ...x^{3+1}$
There must have been an attempt to **expand all 3 brackets** so do not award for e.g.
$(x-3)^2=x^2-6x+9\rightarrow\frac{x^3}{3}-3x^2+9x$
or e.g. $(x-3)^2(2x+5)\rightarrow(x-3)^2\left(x^2+5x\right)$ or $(x-3)^2(2x+5)\rightarrow\frac{1}{3}(x-3)^3(2x+5)$

A1ft: For 2 **different** correctly integrated and simplified terms with **different powers** with indices processed.
Follow through on any **two different terms** with **different powers** of their simplified or unsimplified expansion.