Question Number	Scheme	Marks
1.	$\int (2x-5)(3x+2)(2x+5)\,\mathrm{d}x$ $(2x-5)(3x+2)(2x+5)=(6x^2-11x-10)(2x+5)=\ldots$ $=12x^3+8x^2-75x-50$ $\int (2x-5)(3x+2)(2x+5)\,\mathrm{d}x=3x^4+\frac{8}{3}x^3-\frac{75}{2}x^2-50x+c$	M1 A1 M1, A1ft, A1 **(5 marks)**

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 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) $12x^3+px^2+qx\pm 50$ where $p,q\neq 0$

A1: For $12x^3+8x^2-75x-50$ but allow this unsimplified with the terms uncollected

M1: For an attempt to integrate scored for $\int x^n\mathrm{d}x\rightarrow x^{n+1},\ n\neq 0,$ on any term in x following an attempt to expand. The index must be processed, i.e. $x^3\rightarrow x^4$ and not x^{3+1}. Can be scored following a quadratic expansion, so when $a = 0$

A1ft: Correct follow through on any **two terms** of their ax^3+bx^2+cx+d.
Condone one of a,b,c,d being 0. Can be scored following a quadratic expansion, so when $a = 0$
The terms must now have been collected

A1: $3x^4+\frac{8}{3}x^3-\frac{75}{2}x^2-50x+c$ or exact equivalent including the + c

I am happy to accept terms like $\frac{8}{3x^{-3}}$ for $\frac{8}{3}x^3$

Ignore/condone spurious additional notation such as $\int 3x^4+\frac{8}{3}x^3-\frac{75}{2}x^2-50x+c$

Do not ISW if candidates proceed say to multiply by 6 to get rid of the fractional terms.

Question Number	Scheme	Marks
2.(a)	Attempts $A=\frac{1}{2}ab\sin C \Rightarrow 100=\frac{1}{2}\times 25\times 15\sin BAC$	M1
	$\sin\theta^\circ=\frac{8}{15}$	A1
		(2)
(b)	$\left(BC^2\right)=15^2+25^2-2\times 15\times 25\times\cos"\theta^\circ"$ where $\theta^\circ=\arcsin"\frac{8}{15}"$	M1
	$BC^2=15^2+25^2-2\times 15\times 25\times\cos\left(180-\text{their }'32.2'\right)\Rightarrow BC=...$	dM1
	$BC^2=1484.4...\Rightarrow BC=\text{awrt }38.5\text{ cm}$ cso	A1
		(3)
		(5 marks)

(a)

M1: Attempts to use the area formula $"A=\frac{1}{2}ab\sin C"$ with the given information (condoning slips)

The angle used **should** be θ, BAC, CAB or A with or without any degrees symbol but condone, for this mark only, a direct substitution into the formula to achieve $100=\frac{1}{2}\times 25\times 15\sin C$

A1: Achieves $\sin\theta^\circ=\frac{8}{15}$ or **exact** equivalent fraction such as $\frac{200}{375}, \frac{100}{187.5}$ in the form $\frac{a}{b}$ or $0.5\dot{3}$

Condone answers such as $\theta=\arcsin\frac{8}{15}$ or $\sin\theta^\circ=\frac{8\text{ cm}^2}{15\text{ cm}^2}$

Allow θ to be BAC , CAB or $A\rightarrow a$ with or without any degrees symbol.

Allow C to be just "changed" to θ or any of the above for both marks. E.g.

$100=\frac{1}{2}\times 25\times 15\sin C\Rightarrow\sin\theta^\circ=\frac{8}{15}$ ISW after sight of $\sin\theta^\circ=\frac{8}{15}$

Note that finishing with $\underset{=}{\sin C}=\frac{8}{15}$ is A0 but allow all marks to be scored in (b) following this.

(b)

M1: Attempts to use the cosine rule. Ignore the lhs and allow using an acute angle found using part (a)

Look for $15^2+25^2-2\times 15\times 25\times\cos"\theta^\circ"$ where $\cos\theta^\circ$ is found using their $\sin\theta^\circ$ from part (a)

So allow for $15^2+25^2-2\times 15\times 25\times\cos"32.2^\circ"$ It can be implied by an answer for *BC* of 14.7 cm

Their angle must be correct to the nearest degree for their $\sin\theta^\circ=\frac{8}{15}$. Hence marks can only be achieved in part (b) if their $-1\leqslant\sin\theta^\circ\leqslant 1$.

You may see sight of an exact $\cos\theta^\circ$ being used. E.g. if $\sin\theta^\circ=\frac{8}{15}$ look for $\cos\theta^\circ=\left(\pm\right)\frac{\sqrt{161}}{15}$

dM1: Full use of the cosine rule (with lhs correct) and an obtuse angle used (correct to the nearest degree) leading to a value for *BC*. The obtuse angle must be correct for their part (a), that is $\left(180-\text{their }'32.2'\right)$

A1: CSO $BC=\text{awrt }38.5\text{ cm}$. Condone missing units

SPECIAL CASE

Solutions using radians are possible. So a "correct" solution would be

$BC^2=15^2+25^2-2\times 15\times 25\times\cos\left(\pi-0.5625\right)\Rightarrow BC=38.5$ for M1 dM1 A0

The angle θ given in this question is measured in degrees so this is not a <u>completely</u> correct solution.