Question Number	Scheme	Marks	AOs
5 (a)	Attempts correct cosine rule $\cos\theta° = \dfrac{4^2+5^2-7^2}{2\times4\times5}$	M1	1.1b
	$\cos\theta° = \left\{\dfrac{-8}{40} =\right\} -\dfrac{1}{5}$ *	A1*	1.1b
		(2)	
(b)	Uses e.g. $\sin^2\theta+\cos^2\theta=1 \Rightarrow \sin^2\theta+\dfrac{1}{25}=1 \Rightarrow \sin^2\theta=...$	M1	3.1a
	$\sin\theta° = \sqrt{\dfrac{24}{25}} = \left(\dfrac{2\sqrt{6}}{5}\right)$	A1	1.1b
	Attempts to find the area $= \dfrac{1}{2}\times4\times5\times\sqrt{\dfrac{24}{25}}$	M1	2.1
	$= 4\sqrt{6}$ (cm^2)	A1	1.1b
		(4)	
		(6 marks)	
Notes:			

(a)

M1: Attempts the cosine rule the correct way round $\cos\theta° = \dfrac{4^2+5^2-7^2}{2\times4\times5}$ o.e. such as

$7^2 = 4^2+5^2-2\times4\times5\cos\theta°$

The formula they are substituting into should be correct, with values in the correct place, but condone e.g. a sign slip when they substitute provided a correct formula has been seen.

Allow any argument to be used (that is not clearly incorrect e.g. *C*).

A1*: Arrives at the given answer through correct work and no errors.

There is no need to see the degrees symbol at any point. Should be using θ but condone *A* or *BAC* in the final line. It is acceptable for other arguments to be used in their previous work but recovered in their final line to either θ, *A* or *BAC* provided they are not clearly incorrect e.g. *C*

Condone e.g. –0.2 or $\dfrac{-1}{5}$ or $\dfrac{1}{-5}$ for $-\dfrac{1}{5}$ and there is no need to see $-\dfrac{8}{40}$

(b)

M1: Uses $\pm\sin^2\theta\pm\cos^2\theta=\pm1$ o.e. and proceeds to find an exact value for $\sin\theta$ or $\sin^2\theta$ which may be implied by later work.

Alternatively, uses a right-angled triangle with sides ±1, ±5 and $\pm\sqrt{24}$ in the correct places to find an exact value for $\sin\theta$ or $\sin^2\theta$. May be implied (and you may not see the triangle).

Not scored for use of $\sin\left(\cos^{-1}\left(-\dfrac{1}{5}\right)\right)$

You may see attempts splitting triangle *ABC* into two right-angled triangles and then use of Pythagoras to find the height and lengths of these right-angled triangles. See the alternate mark scheme at the end or use review if unsure.

A1: Correct exact value for $\sin\theta$ which may be unsimplified. Condone inclusion of ±

$\sin\theta=\sqrt{\frac{24}{25}}\left(\text{or }\frac{2\sqrt{6}}{5}\right)$ following sight of 101.5… and without a method seen does **not** imply M1A1. However, $\sin\theta=\sqrt{\frac{24}{25}}\left(\text{or }\frac{2\sqrt{6}}{5}\right)$ without sight of 101.5… implies M1A1.

M1: Complete method to find the area of the triangle, which may be inexact.

While this mark is not dependent on the previous method mark, it does require a correct method to find a value for $\sin\theta$ or $\sin^2\theta$.

Note that they may use the sine rule to find one of the other angles and then attempt

e.g. $\frac{1}{2}\times7\times4\times\sin ABC$

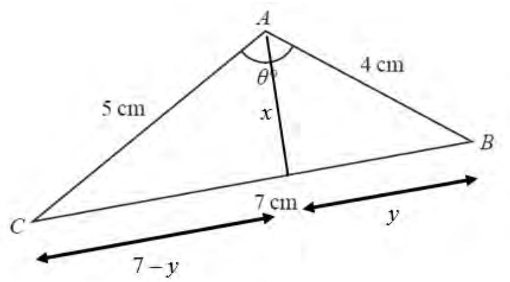
Condone, for this mark only, attempts that use $\sin\left(\cos^{-1}\left(-\frac{1}{5}\right)\right)$ or e.g. $\sin(101.5...)$

A1: $4\sqrt{6}$ {cm^2} must be simplified and must follow award of the previous 3 marks.

Note that some are using $\theta=101.5...$, finding area = awrt 9.80 and then realising this is $4\sqrt{6}$ (or $\sqrt{96}$) and score only the second M mark without an otherwise correct method.

Ignore incorrect units.

Alt (b): Splitting triangle *ABC* and using Pythagoras (condoned)



M1: Complete method to split triangle *ABC* into two right-angled triangles and use Pythagoras and simultaneous equations to find the perpendicular height of the two right-angled triangles. e.g.

$$(7-y)^2+x^2=5^2 \text{ and } y^2+x^2=4^2 \Rightarrow 49-14y=25-16 \Rightarrow y=...\left\{\frac{20}{7}\right\} \Rightarrow x=...\left\{\frac{8\sqrt{6}}{7}\right\}$$

A1: Correct exact perpendicular height of the right-angled triangles.

Note the perpendicular height to *BC* is $\frac{8\sqrt{6}}{7}$, to *AC* is $\frac{8\sqrt{6}}{5}$ and to *AB* is $2\sqrt{6}$

M1: Complete method to find the area of triangle *ABC*, which may be inexact.

e.g. $\frac{1}{2}\times7\times\text{"}\frac{8\sqrt{6}}{7}\text{"}$ or $\frac{1}{2}\times5\times\text{"}\frac{8\sqrt{6}}{5}\text{"}$ or $\frac{1}{2}\times4\times\text{"}2\sqrt{6}\text{"}$

or even e.g. $\frac{1}{2}\times\frac{20}{7}\times\text{"}\frac{8\sqrt{6}}{7}\text{"}+\frac{1}{2}\times\left(7-\frac{20}{7}\right)\times\text{"}\frac{8\sqrt{6}}{7}\text{"}$

While this mark is not dependent on the previous method mark, it does require a correct method to find a value for the perpendicular height of the triangle.

A1: As main scheme.