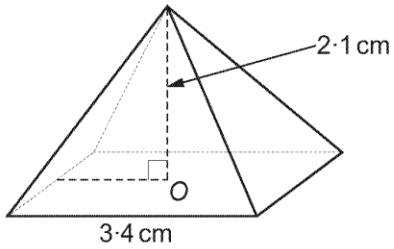
Trigonometreg Pellach

1.

Mae cwmni melysion yn dylunio bisged newydd â siocled drosti, ar siâp pyramid sylfaen-sgwâr.
Mae canol y sylfaen sgwâr wedi'i labelu'n *O*.
Hyd ochrau sylfaen pob bisged fydd 3·4 cm, ac uchder fertigol pob bisged fydd 2·1 cm.



Nid yw'r diagram wedi'i luniadu wrth raddfa

(a) Cyfrifwch yr ongl mae un o'r wynebau trionglog yn ei gwneud â sylfaen y pyramid. [4]

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(b) Mae'r cwmni'n gwybod ei bod yn costio 0·08c y cm^2 i roi siocled dros fisged.
Cyfrifwch y gost o roi siocled dros bob un o 5 wyneb bisged. [6]

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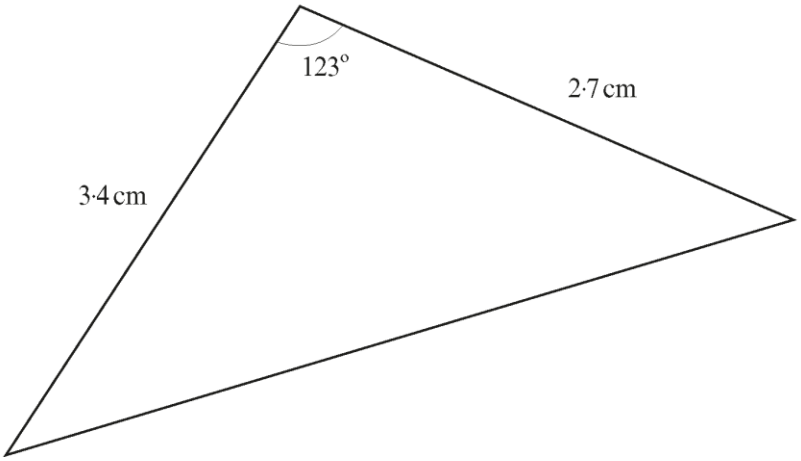

Nid yw'r diagram wedi'i luniadu wrth raddfa

Cyfrifwch arwynebedd y triongl.

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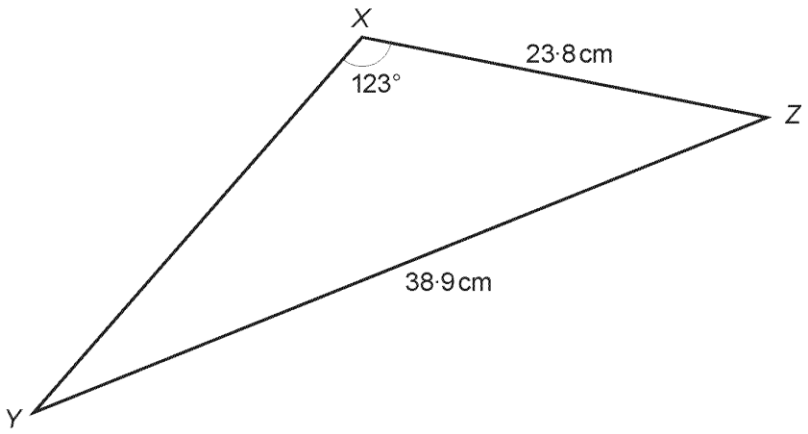
[3]

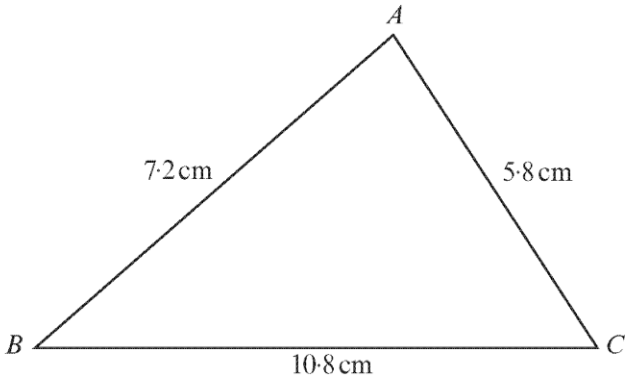
3.



Nid yw'r diagram wedi'i luniadu wrth raddfa

Cyfrifwch faint $X\hat{Y}Z$. [3]

4.



Nid yw'r diagram wedi'i luniadu wrth raddfa

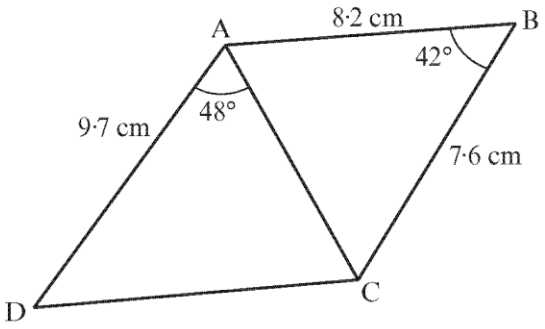
(a) Cyfrifwch faint $B\hat{A}C$.

[4]

(b) Cyfrifwch arwynebedd y triongl ABC.

[3]

5.



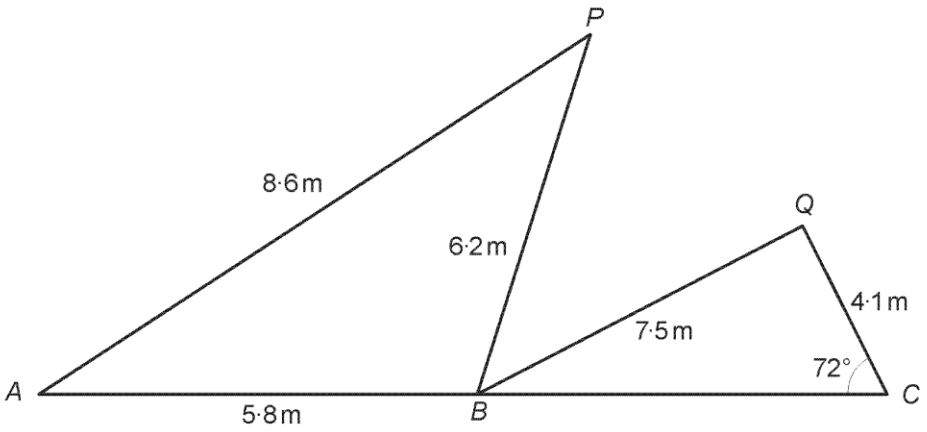
Nid yw'r diagram wedi'i luniadu wrth raddfa

Cyfrifwch arwynebedd y pedrochr *ABCD*.

[5]

6.

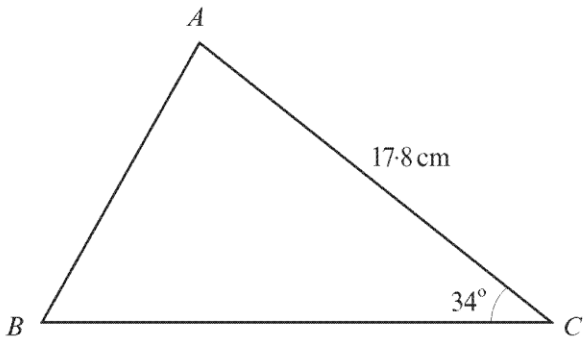
Mae'r diagram yn dangos cynllun o ddraeniau sy'n cysylltu tai yn y pwyntiau *A*, *B*, *C*, *P* a *Q*.



Nid yw'r diagram wedi'i luniadu wrth raddfa

O wybod bod *A*, *B* ac *C* ar linell syth, cyfrifwch faint $P\hat{B}Q$.
Rhowch eich ateb yn gywir i'r radd agosaf. [7]

7.



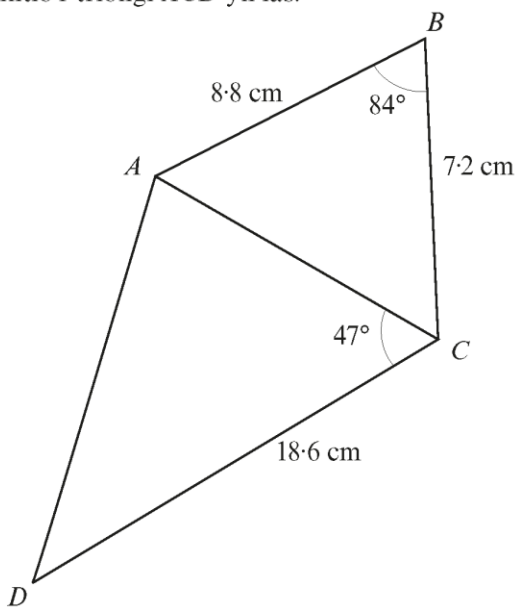
Nid yw'r diagram wedi'i luniadu wrth raddfa

Arwynebedd y triongl ABC yw 42·8 cm^2.
Cyfrifwch hyd AB.

[6]

8.

Mae'r diagram isod yn dangos braslun o logo cwmni.
Mae angen i'r cwmni beintio'r triongl ACD yn las.



Nid yw'r diagram wedi'i luniadu wrth raddfa

Cyfrifwch arwynebedd y triongl ACD.

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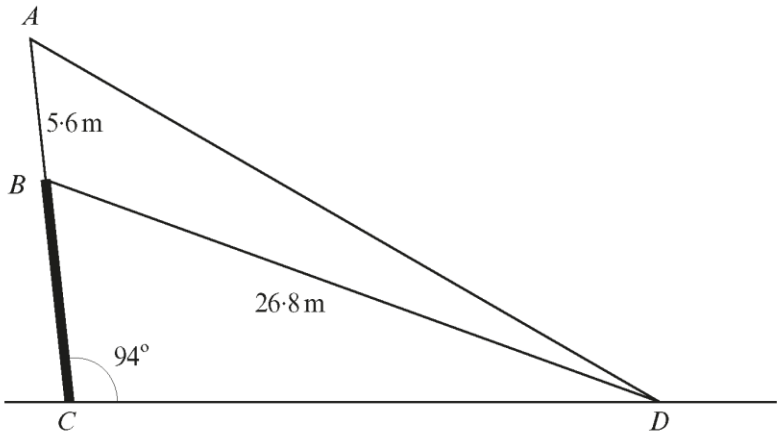
[6]

9.

Mae polyn fflag AB, sydd â'i uchder yn 5·6 m, yn sefyll ar ben wal BC.
Mae ABC yn ffurfio llinell syth.
Mae'r wal yn gwyro *(leans)* ychydig fel ei bod yn gwneud ongl o 94° â'r llawr llorweddol CD.
Ongl godiad *(elevation)* **pen uchaf y wal**, B, o'r pwynt D yw 40°.



Nid yw'r diagram wedi'i luniadu wrth raddfa

O wybod bod $BD = 26{\cdot}8$ m, cyfrifwch AD.

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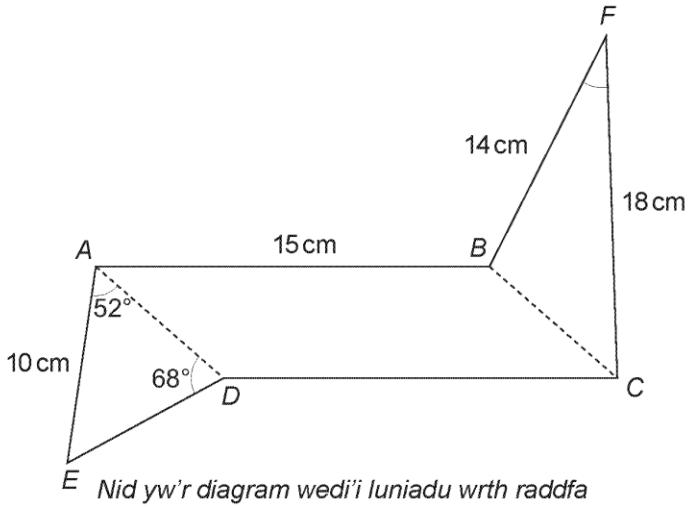
10.

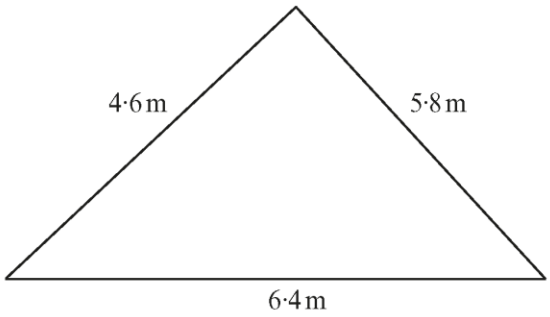
Mae erfyn *(tool)* garddio sydd wedi'i wneud o ddur wedi cael ei weithgynhyrchu drwy gydio *(attaching)* dau ddarn trionglog wrth ddarn sydd ar siâp paralelogram.
Gan ddefnyddio'r wybodaeth sy'n cael ei rhoi yn y diagram, cyfrifwch faint $B\hat{F}C$. [7]



Nid yw'r diagram wedi'i luniadu wrth raddfa

11.

Mae gwely blodau trionglog mewn parc yn cael ei baratoi ar gyfer plannu bylbiau.
Mae'r garddwr yn mynd i osod gwrtaith *(compost)* dros yr holl wely blodau i ddyfnder o 12 cm.



Nid yw'r diagram wedi'i luniadu wrth raddfa

Cyfrifwch gyfaint y gwrtaith sy'n angenrheidiol.

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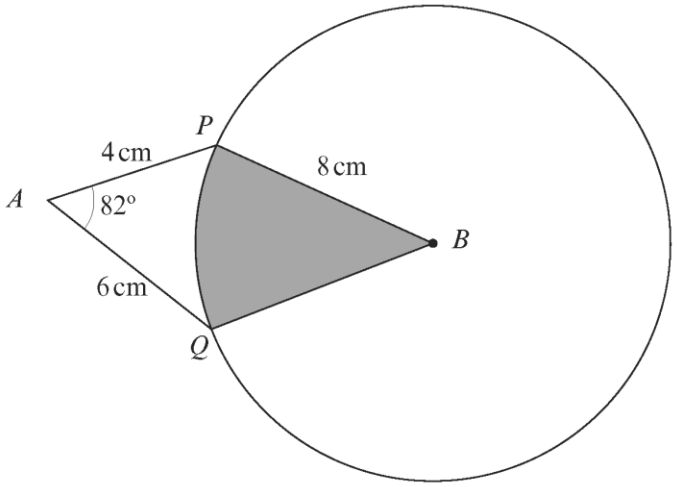
[8]

12.

Mae'r pwynt B yng nghanol y cylch.
Mae'r pwyntiau P a Q ar gylchyn y cylch.



Nid yw'r diagram wedi'i luniadu wrth raddfa

Cyfrifwch arwynebedd y sector sydd wedi'i dywyllu.

[9]

Cynllun Marcio

1.

(a) Nodi'r hyd 1·7 ar driongl cywir (Ongl =) $\tan^{-1}(2·1/1·7)$ = 51(·009…)(°)	S1 M2 A1	Gall gael ei weld neu ei ymhlygu Os yw (a) heb ei ateb, gall gael ei ddyfarnu o (b) Os defnyddir hypotenws, mae angen dull cyflawn M1 am tan(ongl) = 2·1/1·7 Caniatáu ateb sy'n talgrynnu i 51(°)
(b) (Uchder goledd wyneb trionglog^2 =) $2·1^2 + 1·7^2$ Uchder^2 = 7·3 (Uchder =) 2·7(018…) NEU √7·3 (cm)	M1 A1 A1	Dilyn trwodd o M1 am ail isradd 'eu 7·3' wedi'i enrhifo'n gywir os yw 'eu hateb' > 2·1 (cm) *Dulliau eraill:* *M2 am (Uchder =) 2·1/sin 51(·009…)(°)* *NEU M2 am (Uchder =) 1·7/cos 51(·009…)(°)* *Dilyn trwodd 'eu 51(·009…)(°) deilliadol'* *M1 am sin 51(·009…)(°) = 2·1/Uchder* *NEU M1 am cos 51(·009…)(°) = 1·7/Uchder* *A1 am 2·7(018…) (cm)*
(Arwynebedd arwyneb cyfan =) 4×½×3·4×2·7(018…) + $3·4^2$ NEU 4×½×3·4×√7·3 + $3·4^2$ = 29·9(325…)(cm^2)	M1 A1	Dilyn trwodd 'eu 2·7(018…) deilliadol' Noder: $3·4^2$ = 11·56
(Cost y siocled =) 2·39(46…) neu 2·4 (c)	B1	Dilyn trwodd 0·08 × 'eu 29·9(325…)' os dyfarnwyd o leiaf un o'r marciau M1 blaenorol Caniatáu'r ateb 2 (c) o waith cyfrifo cywir Os rhoddir unedau, rhaid iddyn nhw fod yn gywir

2.

11.Use of ½ absinC ½ ×3.4×2.7×sin123° 3.8(49…cm^2)	M1 A1 A1	 Accept 3.9 or 4(cm^2) from appropriate working

3.

12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 23.8 × sin123(°)/38.9 XYZ = 30.871..(°) rounded or truncated correctly	M1 M1 A1 3	OR 23.8/sin XYZ = 38.9/sin123(°) OR $\sin^{-1}$ 0.513... *This M1 implies previous M1*

4.

14.(a) cos A = $\frac{7.2^2 + 5.8^2 - 10.8^2}{2 \times 7.2 \times 5.8}$ cos A = -0.373….. 111.9(059597…°) or 112° (b) Attempt use of ½ absinC ½ × 7.2 × 5.8 × sin 'their A' Answer between 19.35(cm) and 19.4(cm) inclusive	M2 A1 A1 M1 m1 A1 7	M1 for $10.8^2 = 7.2^2 + 5.8^2 - 2 \times 7.2 \times 5.8 \times \cos A$, OR M1 for 1 slip in rearranged form Not for FT of inappropriate rounding or truncation Accept any values for a, b & C, for choice & quote rule 'their A' ≠ 7.2, 5.8 or 10.8 CAO *Candidates choosing to calculate a different angle first, no marks until they reach the '½absinC' stage then FT for their angle with appropriate sides used.*

5.

15. $AC^2 = 8.2^2 + 7.6^2 - 2\times8.2\times7.6\times\cos42$ $AC^2 = 32(.37\ldots)$ $AC = 5.689..$ or 5.7 (cm) $\frac{1}{2}\times8.2\times7.6\times\sin42 + \frac{1}{2}\times9.7\times AC\times\sin48$ Answers in the range 41.35 (cm^2) to 41.4(cm^2) inclusive	M1 A1 A1 M1 A1 5	 FT their AC, but not 8.2, 7.6 or 9.7 (20.85… + 20.50…)

6.

14. $\text{cosPBA} = \frac{6.2^2 + 5.8^2 - 8.6^2}{2\times6.2\times5.8}$	M2	M1 for $8.6^2=6.2^2+5.8^2- 2\times6.2\times5.8\times\text{cosPBA}$
91.4978…(°)	A1	Rounded or truncated
$\text{sinQBC} = \frac{\sin72°\times4.1}{7.5}$	M2	M1 for $\frac{\text{sinQBC}}{4.1} = \frac{\sin72°}{7.5}$ or $\frac{4.1}{\text{sinQBC}} = \frac{7.5}{\sin72°}$
31.326…(°)	A1	Rounded or truncated
Angle PBQ = 57(°)	B1	Do not FT from premature rounding or truncation. Do not accept 58(°) or 57.2(°), must be correct and whole FT provided at least M1 for each of cosine and sine rule awarded

7.

14. Strategy: Use of ½ abSinC and cosine rule	S1	Or equivalent full strategy
$42.8 = \frac{1}{2}\times BC\times17.8\times\sin34$	M1	
BC = 8.59987…	A1	
$AB^2 = BC^2 + 17.8^2 - 2\times BC\times17.8\times\cos34$	M1	FT their BC, but not as 17.8
$AB^2 = 136.98\ldots$	A1	
AB = 11.7(… cm)	A1	Accept 12(cm) from correct working. CAO
		Alternative: *S1 complete strategy, e.g. with perpendicular with appropriate trigonometry for both triangles* *M1, A1 for the RHS triangle*
	6	*M1, A1, A1 for the LHS triangle*

8.

14.Use of cosine rule with triangle ABC **and** ½ab sinC with triangle ACD	S1	Or alternative full strategy
$AC^2 = 8.8^2 + 7.2^2 - 2\times8.8\times7.2\times\cos84$	M1	
AC = 10.7719…	A2	A1 for $AC^2=116(.03\ldots)$
Area ACD = $\frac{1}{2}\times18.6\times AC\times\sin47$	M1	FT their AC, but not 8.8, 7.2 or 18.6
Answers in the range 72.7 to 73.5 (cm^2)	A1	CAO

9.

14. Correct placement of <ABD= 134°	S1	Or 46° if appropriate for their alternative calculations
$AD^2 = 5.6^2 + 26.8^2 - 2\times5.6\times26.8\times\cos134$	M1	
$AD^2 = 958.1(0865\ldots)$	A1	
AD = 30.9(533… m) or 31(m)	A1	FT their 134° provided it is an obtuse angle for possible M1 and final A1 only (use of 140° leads to 31.297…)

10.

18. To be viewed with diagram. Strategy to find AD using sine rule, equating it to BC, then using cosine rule to find angle BFC.	✓	S1	
$AD = 10/\sin 68 \times \sin 60$	✓	M2	M1 for $AD/\sin 60 = 10/\sin 68$
$AD = 9(.340\ldots)$	✓	A1	
$\cos BFC = \frac{14^2 + 18^2 - AD^2}{2\times14\times18}$ (0.8586452...)	✓	M2	FT their derived AD. M1 for $AD^2 = 14^2 + 18^2 - 2\times14\times18\times\cos BFC$
$BFC = 30.8(351\ldots°)$	✓	A1	

11.

19. $6.4^2 = 4.6^2+5.8^2 - 2\times4.6\times5.8\times\cos X$, or $4.6^2 = 6.4^2+5.8^2 - 2\times6.4\times5.8\times\cos Y$, or $5.8^2 = 6.4^2+4.6^2 - 2\times6.4\times4.6\times\cos Z$, or	M1	
Correct rearrangement	m1	This implies the first M1
74.967(…°) or 43.95(..°) or 61(.07….°)	A1	With appropriate rounding, 75, 44, 61
Use of area = ½ ab sinC with appropriate substitution ½ ×4.6×5.8×sin75, or ½ ×6.4×5.8×sin44, or ½ ×4.6×6.4×sin61	M1	FT their 75, 44, 61 if clear this is the included angle as appropriate for M1 only. Not for use of spurious angles (needs to be from calculation)
12.9 (m^2)	A1	Accept 12.883… or appropriately rounded,
Volume compost = 0.12 × 12.9 or 12×129 000	M2	accept 13 FT their 12.9 provided M1 for cosine rule and M1 for ½ abSinC awarded. M1 for 12 × their 12.9, or sight the product with the digits 12 and their 129, may be implied by an answer with correct digits but incorrect place value
1.5(46.. m^3) or 1 546 017(.335cm^3)	A1	Or correct FT response from M2 Accept reasonable rounding or truncation If an incorrect unit is given then A0

12.

14. Strategy to find (½) PQ and <PBQ	S1	
$PQ^2 = 4^2+6^2 - 2.4.6.\text{Cos}82$	M1	
$PQ^2 = 45.31969\ldots$	A1	
$PQ = 6.73199....$	A1	Maybe embedded
$PQ^2 = 8^2+8^2 - 2.8.8.\text{CosPBQ}$	M1	OR *Alternative:* $\sin ½PBQ = ½PQ / 8$ *M1* $< ½PBQ = 24.88...$ *A1* $<PBQ = 49.763...(°)$ *A1*
$\text{Cos PBQ} = \frac{8^2+8^2 - PQ^2}{2.8.8}$	A1	
<PBQ = 49.763…(°)	A1	Accept answers in the range 49.5 to 49.8 inclusive, or 50 Correct answer, not FT
Area shaded = (<PBQ/360) ×Π×8^2	M1	FT their <PBQ provided not 82 and all M marks awarded
= 27.79.. (cm^2) or 28 (cm^2) or 27.8(cm^2)	A1	Accept answers in the range 27.6 to 28 inclusive
	9	