

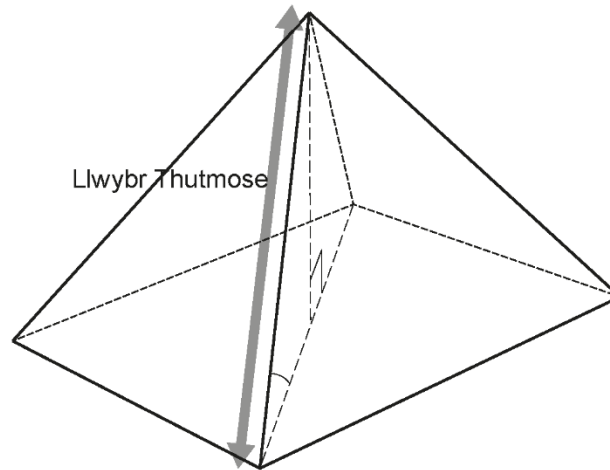
Theorem Pythagoras 3-D

1.

Mae Thutmose yn byw yn yr Aifft ac mae ganddo ddiddordeb mewn pyramidau.



- (a) Adeiladodd yr Eifftwyr byramidau union (*right*). Mae Thutmose yn ymweld â phyramid sydd â sylfaen sgwâr sy'n mesur 230 metr wrth 230 metr. Uchder fertigol y pyramid hwn yw 146 metr. Mae Thutmose yn gwneud ei ffordd i fyny o'r ddaear i dop y pyramid ar hyd un o'r ymylon goleddol (*sloping*).



Nid yw'r diagram wedi'i luniadu wrth raddfa

- (i) Cyfrifwch hyd llwybr Thutmose ar hyd ymyl y pyramid, fel sy'n cael ei ddangos yn y diagram uchod. [5]

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- (ii) Mae pedwar wyneb goleddol (*slanting*) y twred yn mynd i gael eu teilio. Cyfrifwch yr arwynebedd cyfan sydd i gael teils drosto.

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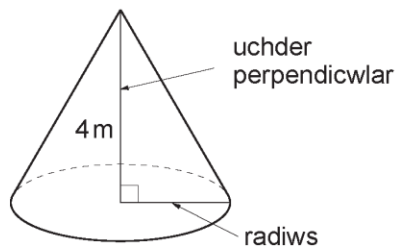
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- (b) Mae *BuildGen* hefyd yn adeiladu tyredau ar siâp côn.



Uchder perpendicwlar y twred hwn yw 4 m.



Cyfaint y twred yw 122 m^3 .
Cyfrifwch radiws y twred hwn.

[3]

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Cynllun Marcio

1.

<p>7(a)(i) (diagonal base² =) $230^2 + 230^2$ diagonal base² = 105800 or diagonal base = $\sqrt{105800}$</p> <p>path² = $(\frac{1}{2} \text{ diagonal base})^2 + 146^2$ path² = 47766 or path = $\sqrt{47766}$ Path 218.6 or 218.5(543...)(m)</p>	M1	diagonal base = 325.269..., $\frac{1}{2}$ diagonal base = 162.63... or $115\sqrt{2}$ FT $\frac{1}{2}$ their diagonal base, but not 230 or 115 Must be for correct $\frac{1}{2}$ diagonal base used Accept 218 or 219 from correct working Alternative for the 1 st 3 marks: $path^2 = 115^2 + 115^2 + 146^2$ M3
	A1	
	M1	OR
	A1	$115^2 + 115^2$ OR $115^2 + 146^2$ M1
	A1	= 26450 OR = 34541 A1
	A1	$path^2 = 26450 + 146^2$ OR $path^2 = 34541 + 115^2$ M1

2.

(a) Idea to form right angled triangle to find the height and use Pythagoras' Theorem followed by $V = \frac{1}{2} \text{ base area} \times \text{height}$ (Perpendicular height ² =) $7.2^2 - (\frac{1}{2} \times 4.2)^2$ Perpendicular height ² = 47.43 or Perpendicular height = $\sqrt{47.43}$ Perpendicular height = 6.8(869... cm)	S1	Or use of other complete method
	M1	
	A1	
	A1	
Volume = $\frac{1}{3} \times 4.2 \times 4.8 \times 6.8(869...)$ = 46.2(802... cm ³)	M1	FT 'their perpendicular height' provided Pythagoras' Theorem or Trig used to derive a perpendicular height Allow 46.3(68 cm ³) (from PA h = 6.9cm)
	A1	

3.

Applications Unit 2 Higher Tier June 2015	Mark	Comment
11(a)(i) Realising shorter rods around the base AND $(BD^2 =) 6^2 + 6^2$ $BD^2 = 72$ or $BD = \sqrt{72}$ $BD = 8.485... (m)$	M1	Accept as unique calculation shown, or calculation selected for further progress
	A1	
	A1	Accept rounded or truncated at this stage
$\cos D = \frac{1}{2} BD/10$ 64.9° or 65°	m1	FT their BD provided M1 awarded
	A2	CAO not from premature rounding A1 for $D = \cos^{-1} \frac{1}{2} BD/10$. <i>If final m0 A0, allow SC1 for an answer of 31.9(... °) or 32(°) from $\cos D = BD/10$</i>
(ii) (Height of triangle) ² = $10^2 - 3^2$ (=91) Height of triangle = 9.539... (m) Area = $(4 \times) \frac{1}{2} \times 6 \times \text{height of triangle}$ Answers in the range 114(m ²) to 114.5(m ²)	M1	Or equivalent with cosine rule (and $\frac{1}{2} \text{ absinC}$)
	A1	
	m1	
	A1	CAO. Accept rounded or truncated
(b) Volume = $\frac{1}{3} \times \pi \times r^2 \times h$ used, e.g. sight of $(122 =) \frac{1}{3} \times \pi \times r^2 \times 4$ $r^2 = 122 \div (\frac{1}{3} \times \pi \times 4)$ or equivalent	M1	Not for stating the formula alone
	A1	$r^2 = 29.1...$
Answers in the range 5.3957... (m) to 5.398.. (m) or 5.4(m)	A1	Accept unsupported correct answer
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