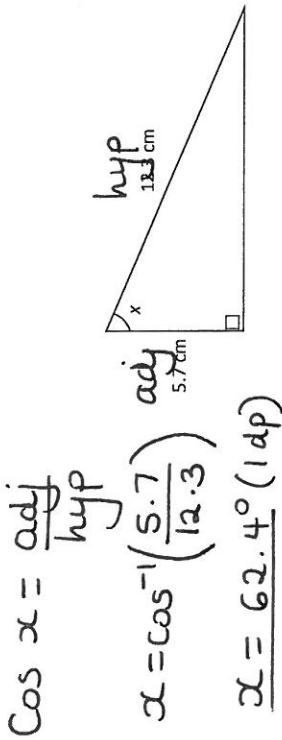


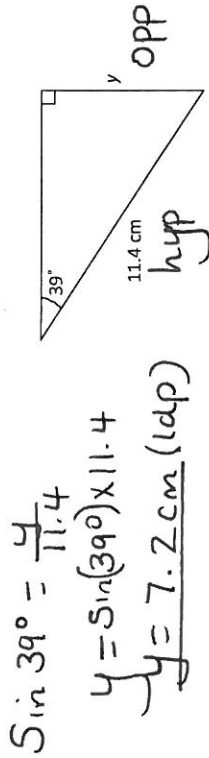
Pythagoras and trigonometry

(2005-2)

- 17 (a) Find the size of angle x in the right-angled triangle below.



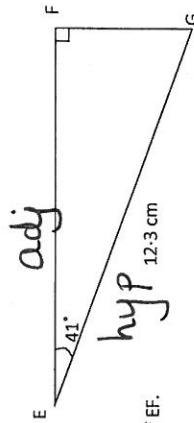
- (b) Find the length of the side marked y in the right-angled triangle below.



(2006-2)

- 15 (a) The triangle EFG is a right-angled triangle with $\hat{EFG} = 90^\circ$.

The length $EG = 12.3 \text{ cm}$ and $\hat{GEF} = 41^\circ$.



Calculate the length of EF.

$$\cos 41 = \frac{EF}{12.3}$$

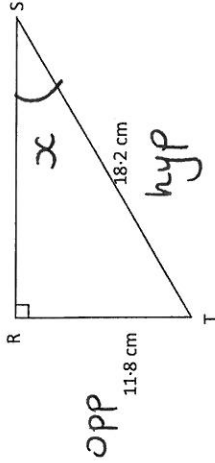
$$EF = \cos(41) \times 12.3$$

$$= \underline{9.3 \text{ cm (1dp)}}$$

[2]

- (b) The triangle RST is a right-angled triangle with $\hat{TRS} = 90^\circ$.

The length $RT = 11.8 \text{ cm}$ and the length $ST = 18.2 \text{ cm}$



[3]

Calculate the size of the angle RST.

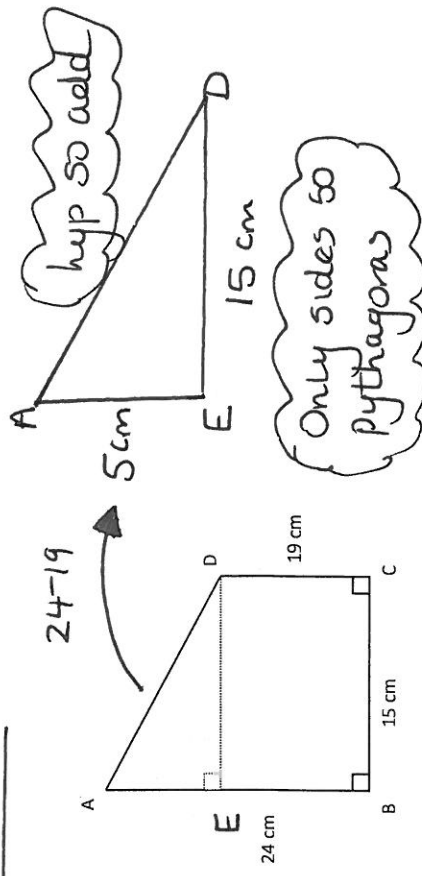
$$\sin a = \frac{11.8}{18.2}$$

$$a = \sin^{-1}\left(\frac{11.8}{18.2}\right)$$

$$= \underline{40.4^\circ}$$

(2007-2)

6



The above diagram shows a trapezium ABCD with $AB = 24 \text{ cm}$, $BC = 15 \text{ cm}$ and $CD = 19 \text{ cm}$. Angle $\hat{ABC} = 90^\circ$ and angle $\hat{BCD} = 90^\circ$.

Calculate the length of AD , giving your answer to an appropriate degree of accuracy.

Calculate the length of AD , giving your answer to an appropriate degree of accuracy.

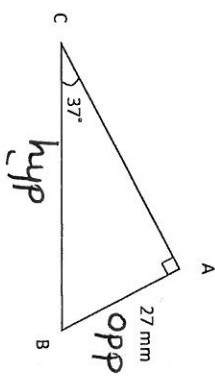
$$AD = \sqrt{5^2 + 15^2}$$

$$= \sqrt{250}$$

$$= \underline{15.8 \text{ cm (1dp)}}$$

[5]

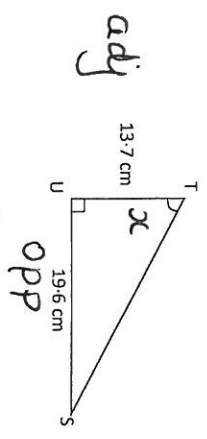
14 (a) The triangle ABC is such that $\hat{CAB} = 90^\circ$, $AB = 27$ mm and $\hat{ACB} = 37^\circ$.



Calculate the length of BC

$$\sin 37 = \frac{\text{opp}}{\text{hyp}} = \frac{27}{BC} \quad [3]$$

(b) The triangle STU is such that $\hat{TUS} = 90^\circ$, $SU = 19.6$ cm and $\hat{UTS} = 13.7$ cm.



Calculate the size of angle STU.

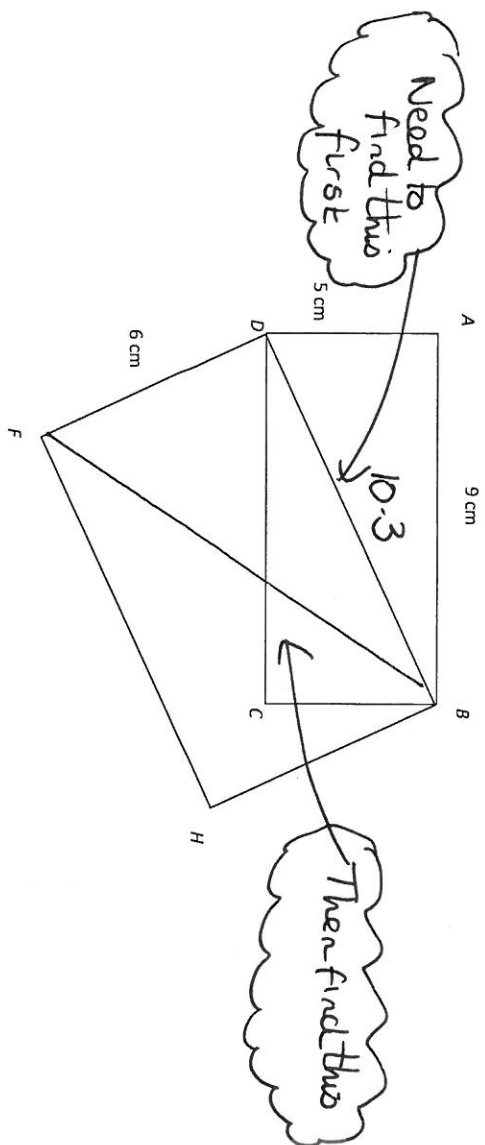
$$\tan \alpha = \frac{\text{opp}}{\text{adj}} = \frac{19.6}{13.7} \quad [3]$$

$$\alpha = \tan^{-1} \left(\frac{19.6}{13.7} \right) = 55.0^\circ \text{ (1dp)}$$

Make sure opp on top

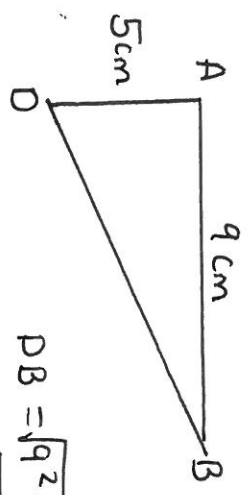
(2008-2)

9 A pattern is made from two rectangles, ABCD and DBHF.

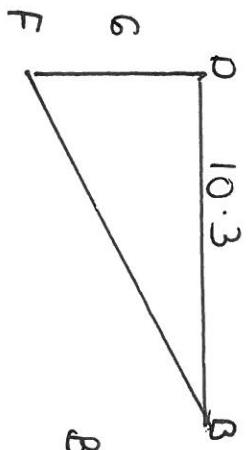


In the diagram $AD = 5$ cm, $AB = 9$ cm and $DF = 6$ cm.

Calculate the length of the diagonal of rectangle DBHF.

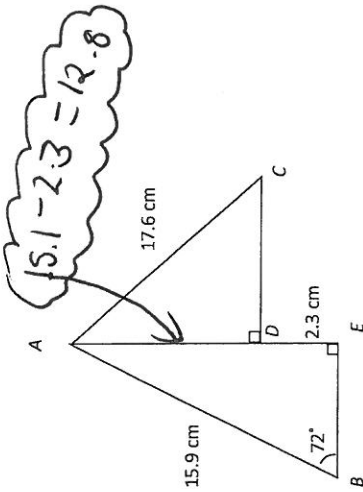


$$DB = \sqrt{9^2 + 5^2} = \sqrt{106} = 10.3 \text{ (1dp)}$$

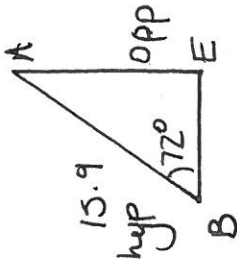


$$BF = \sqrt{10.3^2 + 6^2} = \sqrt{106 + 36} = \sqrt{142} = 11.9 \text{ cm (1dp)}$$

16 In the diagram below, the triangle ABE is right-angled at E and the triangle ADC is right-angled at D.



a) find the length of AE.



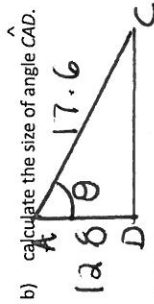
$$\sin 72 = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 72 = \frac{AE}{15.9}$$

$$AE = \sin(72) \times 15.9$$

$$= 15.1 \text{ cm (1dp)}$$

b) calculate the size of angle CAD.



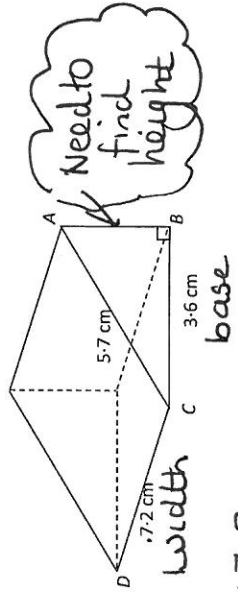
$$\cos \theta = \frac{12.8}{17.6}$$

$$\theta = \cos^{-1}\left(\frac{12.8}{17.6}\right) = 43.3^\circ \text{ (1dp)}$$

(2009-2)

7 A prism has a uniform cross-section in the shape of a right-angled triangle ABC.

Given that $\hat{ABC} = 90^\circ$, $CB = 3.6 \text{ cm}$, $CA = 5.7 \text{ cm}$ and that the length, CD , of the prism is 7.2 cm , calculate the volume of the prism.



$$AB = \sqrt{5.7^2 + 3.6^2}$$

$$= 6.9$$

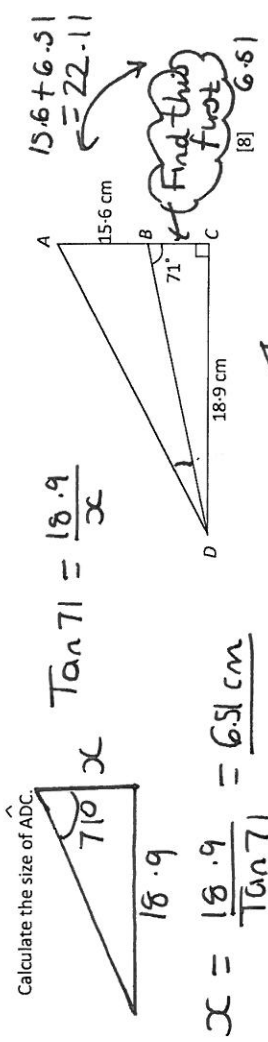
$$\text{Volume} = 3.6 \times 4.4 \times 7.2$$

$$= 57.0 \text{ cm}^3$$

[6]

(2009-2)

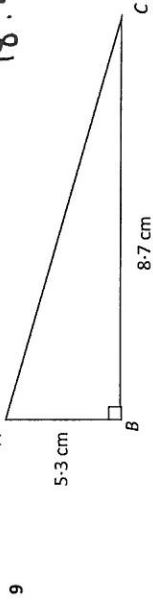
12 In the following diagram, $AB = 15.6 \text{ cm}$, $DC = 18.9 \text{ cm}$, $\angle BDC = 71^\circ$ and $\angle DCA = 90^\circ$.



$$\tan 71 = \frac{18.9}{x}$$

$$x = \frac{18.9}{\tan 71} = 6.51 \text{ cm}$$

(2010-2)

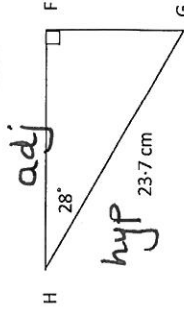


Find the length of AC.

Give your answer to an appropriate degree of accuracy.

$$AC = \sqrt{5.3^2 + 8.7^2} = 10.2 \text{ (1dp) cm}$$

12 a) Calculate the length of HF.



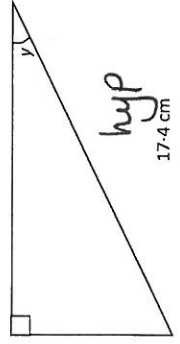
$$\cos 28^\circ = \frac{\text{adj}}{\text{hyp}}$$

$$\cos 28^\circ = \frac{HF}{23.7}$$

$$HF = \cos(28) \times 23.7$$

$$HF = 20.9 \text{ cm}$$

b) Calculate the size of angle y.



$$\sin y = \frac{\text{opp}}{\text{hyp}}$$

$$\sin y = \frac{9.4}{17.4}$$

$$y = \sin^{-1}\left(\frac{9.4}{17.4}\right) = 32.7^\circ \text{ (1dp)}$$

[3]

[3]

