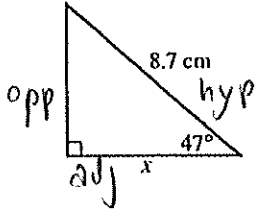


SOLUTIONS

Trigonometry

Calculate the length of the unknown sides (labelled x) correct to 1 decimal place.

(a)



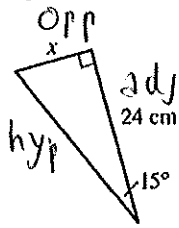
$$\begin{aligned} \text{adj} &= x \\ \text{hyp} &= 8.7 \\ \theta &= 47^\circ \end{aligned}$$

$$\cos(47^\circ) = \frac{x}{8.7}$$

$$x = 8.7 \cos(47^\circ)$$

$$x = \underline{5.93} \quad \therefore 5.93 \text{ cm}$$

(b)



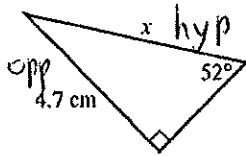
$$\begin{aligned} \text{adj} &= 24 \\ \text{opp} &= x \\ \theta &= 15^\circ \end{aligned}$$

$$\tan(15^\circ) = \frac{x}{24}$$

$$x = 24 \tan(15^\circ)$$

$$x = \underline{6.43}$$

(c)

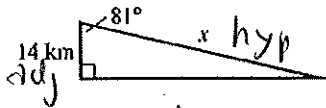


$$\sin(52^\circ) = \frac{4.7}{x}$$

$$x = \frac{4.7}{\sin(52^\circ)}$$

$$x = \underline{5.96}$$

(d)



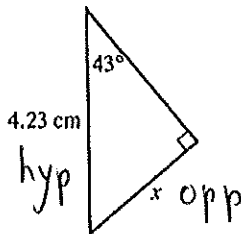
$$\begin{aligned} \text{hyp} &= x \\ \text{adj} &= 14 \\ \theta &= 81^\circ \end{aligned}$$

$$\cos(81^\circ) = \frac{14}{x}$$

$$x = \frac{14}{\cos(81^\circ)}$$

$$x = \underline{89.49}$$

(e)



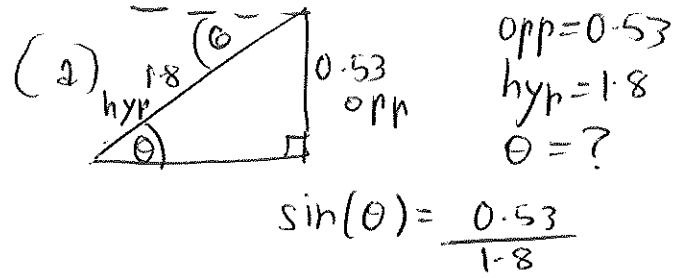
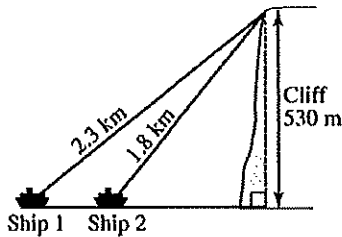
$$\sin(43^\circ) = \frac{x}{4.23}$$

$$x = 4.23 \sin(43^\circ)$$

$$x = \underline{2.88}$$

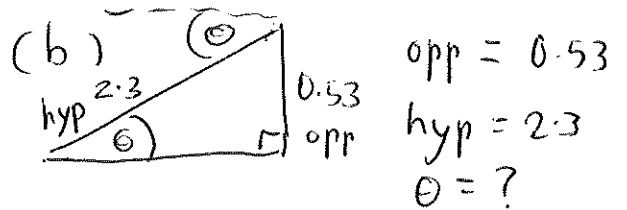
Christov looks out towards the sea from the top of a cliff and notices 2 ships.

- What is the angle of depression from Christov to Ship 2? Give your answer correct to one decimal place.
- What is the angle of depression from Christov to Ship 1? Give your answer correct to one decimal place.
- Calculate the distance separating the two ships. Give your answer correct to the nearest metre.



$$\theta = \sin^{-1}\left(\frac{0.53}{1.8}\right)$$

$$\theta = 17.1^\circ$$



$$\sin(\theta) = \frac{0.53}{2.3}$$

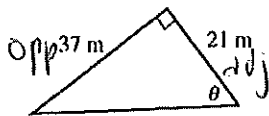
$$\theta = \sin^{-1}\left(\frac{0.53}{2.3}\right)$$

$$\theta = 13.3^\circ$$

96

Evaluate the angle θ in these triangles to the nearest degree.

(a)

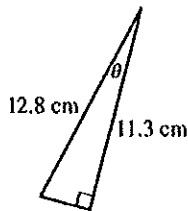


$$\tan(\theta) = \frac{37}{21}$$

$$\theta = \tan^{-1}\left(\frac{37}{21}\right)$$

$$\theta = 60.4^\circ$$

(b)

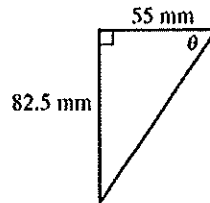


$$\cos(\theta) = \frac{11.3}{12.8}$$

$$\theta = \cos^{-1}\left(\frac{11.3}{12.8}\right)$$

$$\theta = 28^\circ$$

(c)



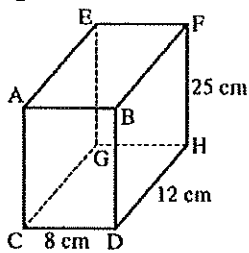
$$\tan(\theta) = \frac{82.5}{55}$$

$$\theta = \tan^{-1}\left(\frac{82.5}{55}\right)$$

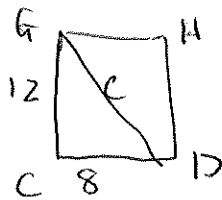
$$\theta = 56.3^\circ$$

Pythagoras Theorem

Q1



Find the length of GD and hence find the length of ED correct to 2 decimal places.



$$c^2 = 12^2 + 8^2$$

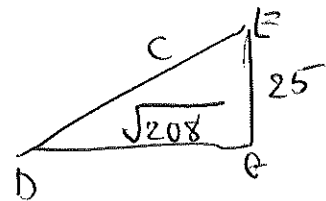
$$c^2 = 144 + 64$$

$$c^2 = 208$$

$$c = \sqrt{208}$$

$$c = 14.42$$

$$GD = 14.42 \text{ cm}$$



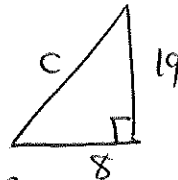
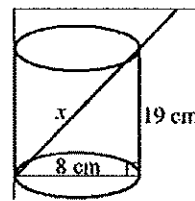
$$c^2 = (\sqrt{208})^2 + 25^2$$

$$c^2 = 208 + 625 = 833$$

$$c = \sqrt{833} = 28.86$$

Q2

Beth places her straw in a can of soft drink. The height of the can is 19 cm and the diameter is 8 cm. If the length of her straw is 26 cm, how much is it above the top of the can?

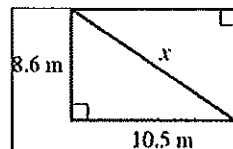


$$c^2 = 19^2 + 8^2$$

$$c = \sqrt{19^2 + 8^2}$$

$$c = 20.62$$

Q3



\therefore Overhang

$$= 26 - 20.62$$

$$= 5.38 \text{ cm}$$

(a) Find the length of the diagonal of the rectangle in this figure.

$$x^2 = 8.6^2 + 10.5^2$$

$$x = \sqrt{8.6^2 + 10.5^2}$$

$$x = 13.57$$

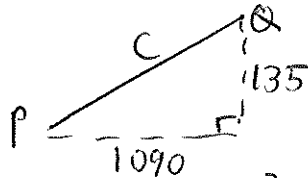
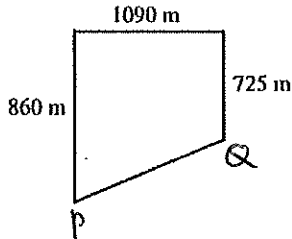
(b) Find the area of the triangle in this figure.

$$A = \frac{bh}{2} = \frac{8.6 \times 10.5}{2}$$

$$= 45.15 \text{ cm}^2$$

Q4

Gemma goes bike riding and travels 725 m north, then 1090 m west and then 860 m south. She stops for a rest. How far is she from her starting point?



$$c^2 = 1090^2 + 135^2$$

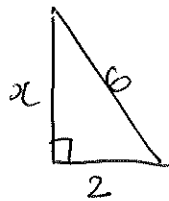
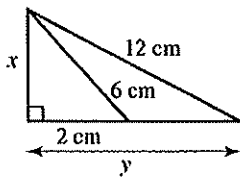
$$c = \sqrt{1090^2 + 135^2}$$

$$c = 1098.3 \text{ m}$$

Q5

Find the value of the pronumerals in these figures. Give answers correct to 2 decimal places, where appropriate.

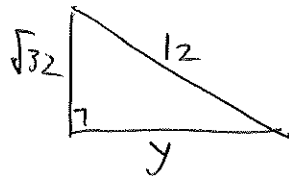
(a)



$$x^2 = 6^2 - 2^2$$

$$x^2 = 32$$

$$x = \sqrt{32} \approx \underline{\underline{5.66}}$$



$$y^2 = 12^2 - (\sqrt{32})^2$$

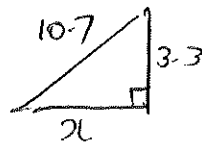
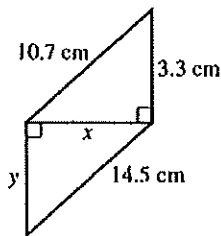
$$= 144 - 32$$

$$= 112$$

$$y = \sqrt{112}$$

$$y = \underline{\underline{10.58}}$$

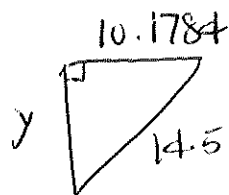
(b)



$$x^2 = 10.7^2 - 3.3^2$$

$$x = \sqrt{10.7^2 - 3.3^2}$$

$$x \approx \underline{\underline{10.18}}$$



$$y^2 = (14.5)^2 - (10.1784)^2$$

$$y = \sqrt{14.5^2 - (10.1784)^2}$$

$$y = \underline{\underline{10.33}}$$