Solutions

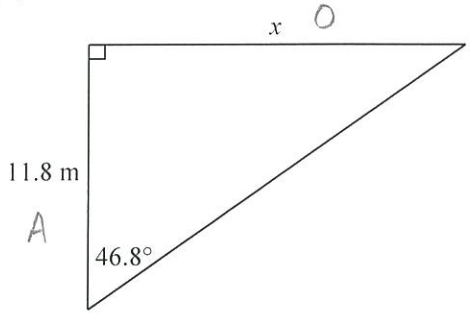
Stage 1 Mathematical Applications — Test – Trigonometry 1 (F)

Unit: Trigonometry
Date: 01/07/2014

Total time: 45 minutes
Total marks: 24 marks

QUESTION 1 ***Finding Sides and Angles*** ***(10 marks)***

(a) Find the value of x in:

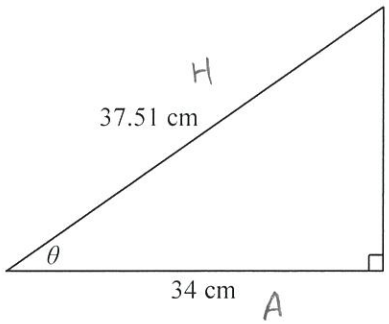


$\tan(46.8^\circ) = \frac{x}{11.8}$ ✓

$\therefore x = 11.8 \times \tan(46.8^\circ)$ ✓

$= \underline{12.57\text{ m}}$

(b) Find the value of θ in:

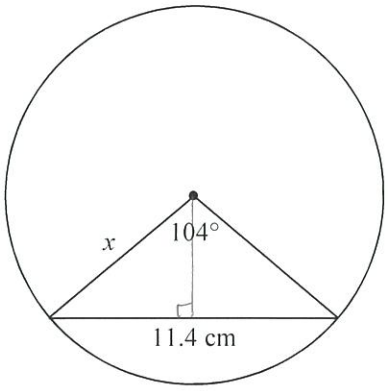


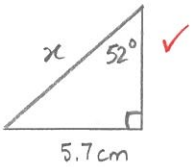
$\cos\theta = \frac{34}{37.51}$ ✓

$\therefore \theta = \cos^{-1}\left(\frac{34}{37.51}\right)$ ✓

$= \underline{24.98^\circ}$

(c) Find the value of x in:





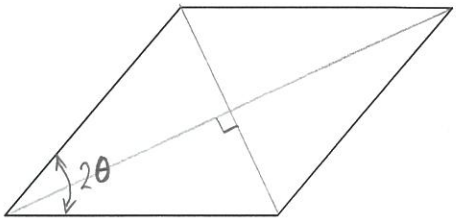
✓

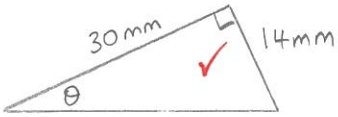
$\sin(52^\circ) = \frac{5.7}{x}$ ✓

$\therefore x = 5.7 \div \sin(52^\circ)$ ✓

$= \underline{7.23\text{ cm}}$

(d) A rhombus has diagonals of lengths 60 mm and 28 mm respectively. Find the smaller angle of the rhombus.





✓

$\tan\theta = \frac{14}{30}$

$\therefore \theta = \tan^{-1}\left(\frac{14}{30}\right)$ ✓

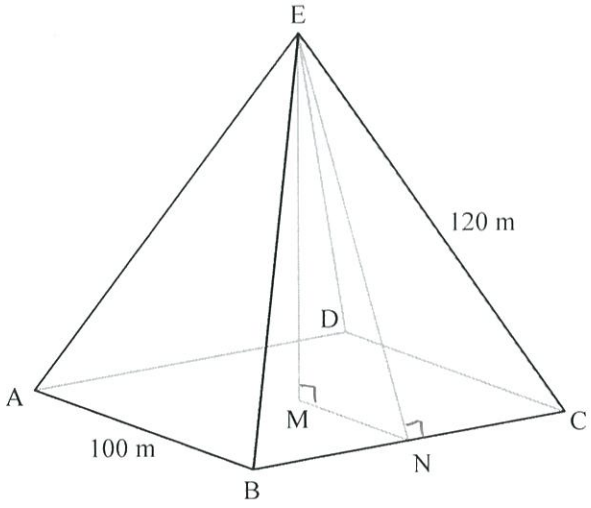
$= 25.02^\circ$

Smaller angle of rhombus $= 2\theta$

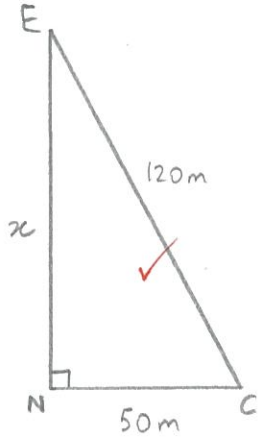
$= \underline{50.03^\circ}$ ✓

QUESTION 2 ***3-Dimensional Problem Solving*** ***(6 marks)***

A square based pyramid has base lengths 100 m and slant edges 120 m as shown:
(M is the centre of the square, and N is the midpoint of BC)

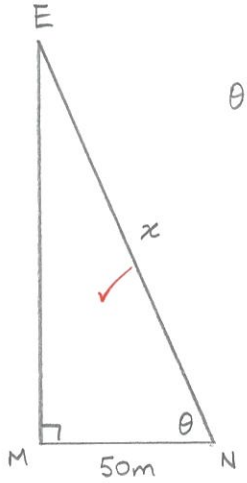


(a) Find the measure of angle ENM.



$x = \sqrt{120^2 - 50^2}$

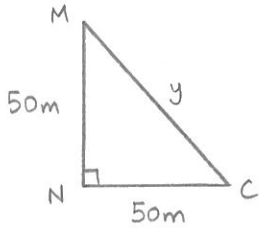
$= \underline{109.09\text{m}}$ ✓



$\theta = \cos^{-1}\left(\frac{50}{x}\right)$

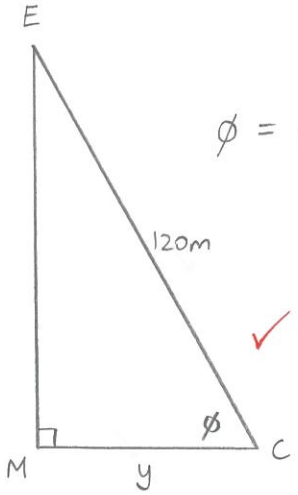
$= \underline{62.72^\circ}$ ✓

(b) Find the measure of angle ECM.



$y = \sqrt{50^2 + 50^2}$

$= \underline{70.71\text{m}}$ ✓

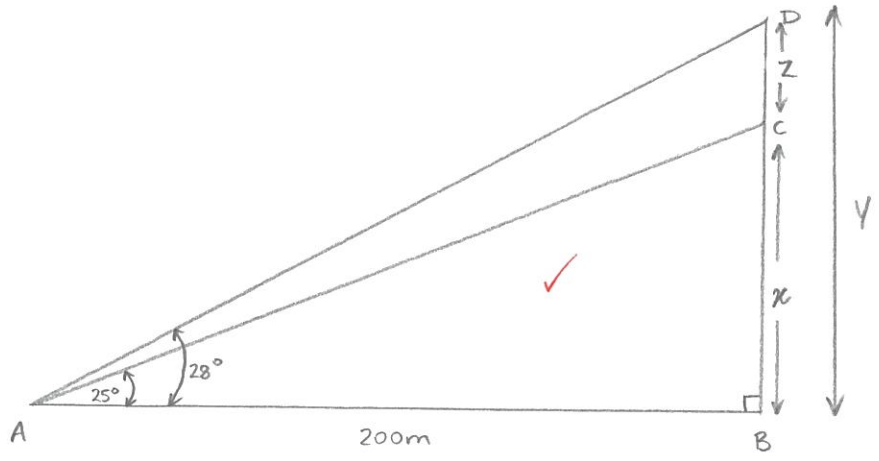


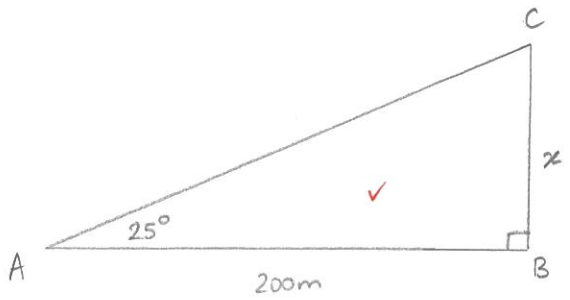
$\phi = \cos^{-1}\left(\frac{y}{120}\right)$

$= \underline{53.90^\circ}$ ✓

QUESTION 3 ***Problem Solving Using Trigonometry*** ***(8 marks)***

From a point A, 200 metres from the base of a building B, the angle of elevation to the top of the building C is 25°, and to the top of the flagpole D on top of the building is 28°. Find the height of the flagpole.

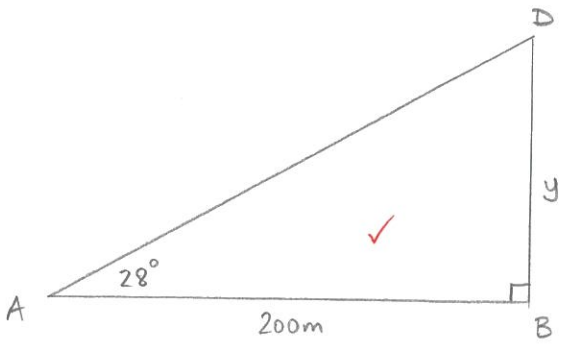




$$\tan(25°) = \frac{x}{200}$$

$$\therefore x = 200 \times \tan(25°)$$

$$= \underline{93.26\text{m}}$$



$$\tan(28°) = \frac{y}{200}$$

$$\therefore y = 200 \times \tan(28°)$$

$$= \underline{106.34\text{m}}$$

$$z = x - y$$

$$= \underline{13.08\text{m}}$$