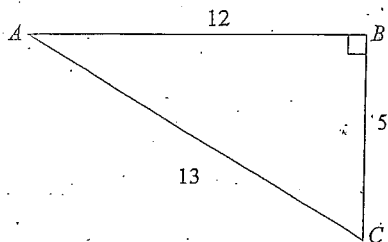


Math

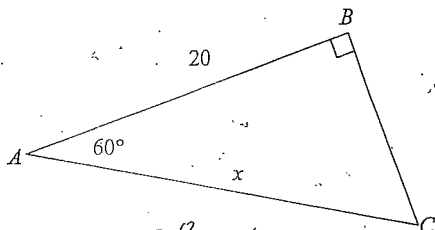
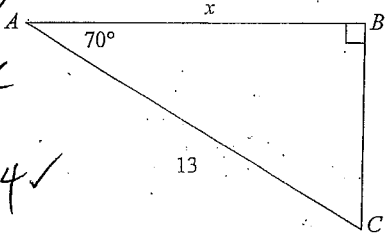
PART 2. TRIGONOMETRY

1. (a)  $\sin A = \frac{5}{13}$  ✓ 1  
 (b)  $\cos C = \frac{12}{13}$  ✓ 1  
 (c)  $\tan A = \frac{5}{12}$  ✓ 1  
 (d) which trigonometric ratio is equal to  $\frac{12}{5}$ ? 1  
 $\tan C$  ✓



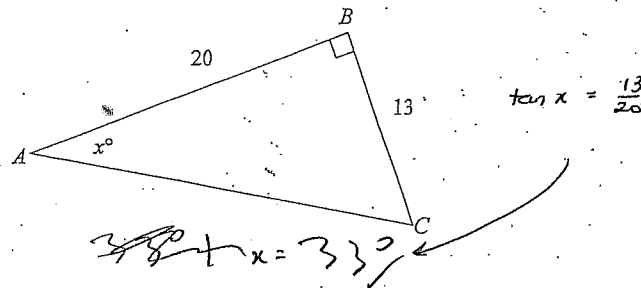
2. Find the value of the pronumeral in the following (give your answer correct to 1 decimal place where necessary):

(a)  $\cos 70 = \frac{x}{13}$   
 $13 \cos 70 = x$   
 $x = 4.4$  ✓



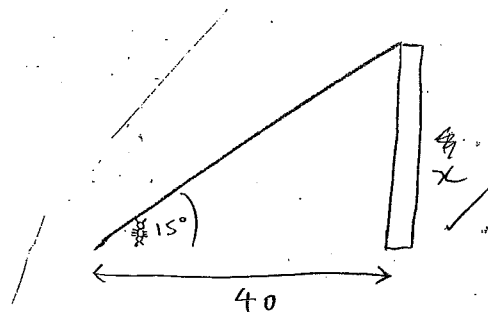
$\cos 60 = \frac{20}{x}$  ✓  
 $x = 40$  ✓

- (c) give your answer to the nearest degree



- (d) Jasmine the ant stands 40m from a wall. She notices that the angle of elevation of the top of the wall is  $15^\circ$ .

- (i) Draw a neat diagram to represent this information.

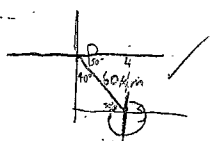


- (ii) Find the height of the wall

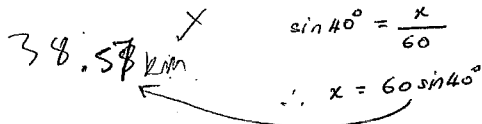
$\tan 15^\circ = \frac{x}{40}$   
 $\therefore x = 40 \tan 15^\circ$   
 $x = 10.72 \text{ m}$

(e) A ship A leaves port and travels 60km on a bearing of 140°.

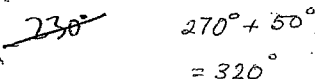
(i) Draw a neat diagram to represent this information.



(ii) How far east of its starting point is the ship now?

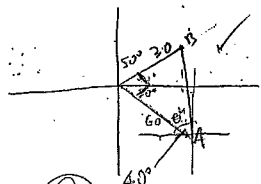


(iii) What is the bearing of the starting point from the ship?

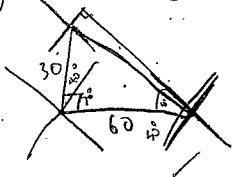


(iv) At same time as A left port a second ship B travelled 30km on a bearing of N50°E

(a) Find the distance between the two ships.



(b) Find the bearing of ship B from ship A.



$$67.01$$

$$\sqrt{4500} \text{ km}$$

$$= 30\sqrt{5} \text{ km}$$

Need to show working

$$346^{\circ} 34'$$

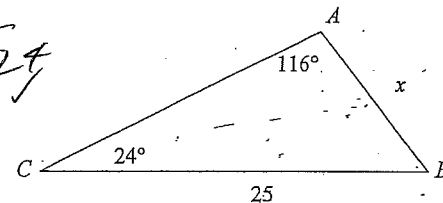
PART C FURTHER TRIGONOMETRY

$$\frac{a}{\sin A} = \frac{b}{\sin B} \quad a^2 = b^2 + c^2 - 2bc \cos A \quad \cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

(a) Find x correct to one decimal place.

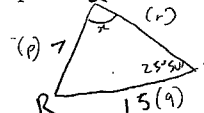
$$\frac{25}{\sin 116} = \frac{x}{\sin 24}$$

$$x = 11.3 \checkmark$$



(b) Sketch the triangle PQR, in which p = 7, q = 15 and angle P = 25°50'

(i) Find the two possible sizes of the angle Q, correct to the nearest minute



$$\frac{\sin x}{15} = \frac{\sin 25^{\circ} 50'}{7}$$

$$x = 69^{\circ} 21' \text{ or } 110^{\circ} 58' \checkmark$$

(ii) For the larger value of angle Q, find r correct to 1 decimal place.

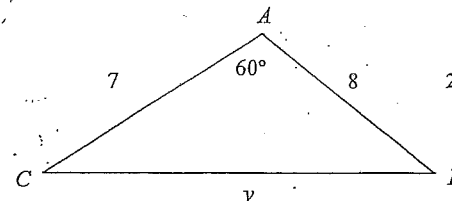
$$a^2 = b^2 + c^2 - (2bc \cos A)$$

$$a^2 = 7^2 + 15^2 - (2 \times 7 \times 15 \times \cos 140^{\circ} 58')$$

$$r = 18.7 \checkmark$$

(c) Find the exact value of y

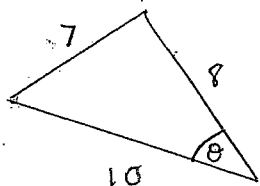
$$y = \sqrt{57} \checkmark$$



$$a^2 = 7^2 + 8^2 - (2 \times 7 \times 8 \times \cos 60)$$

- (d) A triangle has sides 7cm, 8cm and 10cm. Find the size of the angle opposite the smallest side.

3



$$\cos A = \frac{64 + 100 - 49}{2 \times 8 \times 10} \checkmark$$

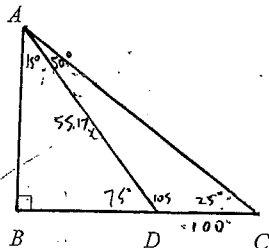
$$44^\circ 3' \checkmark$$

- (e) In the diagram  $CD = 100\text{m}$ ,  $\angle ACB = 25^\circ$  and  $\angle ADB = 75^\circ$

- (i) Find the length of  $AD$  (2 decimal places) 2

Do not use sine rule for right Δ  
Just  $x = 55.17 \checkmark$

$$\frac{100}{\sin 25^\circ} = \frac{x}{\sin 10^\circ}$$



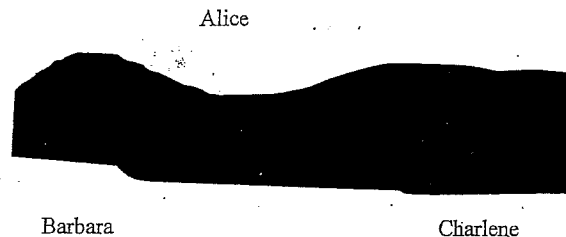
- (ii) Find the length of  $AB$  (2 decimal places) 2

$$53.29 \checkmark$$

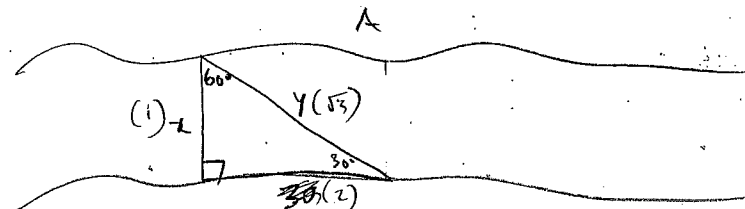
6

- (f)

4



Alice is on the opposite side of a river to Barbara and Charlene. Barbara has a ruler, protractor and calculator. Describe in detail how the girls could work out the width of the river. None of the girls are allowed to cross the river. Your explanation should be careful, detailed and at least half a page in length. You may wish to use diagrams to illustrate your method.



$$\frac{22}{x}$$

$$\cos 30 = \frac{2}{\sqrt{3}}$$

$$\tan 30 = \frac{1}{\sqrt{3}}$$

$$\text{as } \tan 30 = \frac{1}{\sqrt{3}} = \frac{x}{20x}$$

First choose a fixed object e.g. a rock or tree on the opp. bank

Measure across until the angles  $30^\circ$  line up with the other end of the bank and the point perpendicular to B then using exact ratios:  $\frac{1}{\sqrt{3}} = \frac{x}{20x}$

7