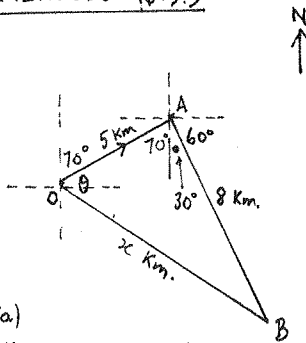


EXERCISES 16.5.5

1.



(a)

Using cosine rule,

$$x^2 = 5^2 + 8^2 - 2 \times 5 \times 8 \cos 100^\circ$$

$$\therefore x \approx 10.14356$$

Distance directly from

starting point is approx. 10.14 km.

(b)

Using sine rule,

$$\frac{\sin \theta}{8} = \frac{\sin 100^\circ}{10.14356}$$

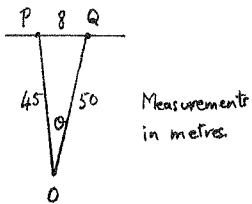
$$\therefore \theta \approx 50.96^\circ$$

Final bearing from his

starting point is $(70 + 50.96)^\circ$ T

i.e. approx. 121^\circ T.

2.

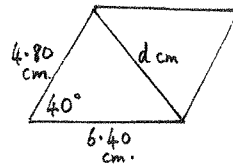


Using cosine rule,

$$\cos \theta = \frac{45^2 + 50^2 - 8^2}{2 \times 45 \times 50}$$

$$\therefore \theta \approx \underline{7^\circ 33'} \text{ (required angle)}$$

3.



Using cosine rule,

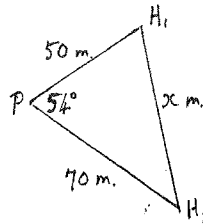
$$d^2 = 4.80^2 + 6.40^2 - 2 \times 4.80 \times 6.40 \cos 40^\circ$$

$$\therefore d \approx 4.115$$

Length of shorter diagonal is

approx. 4.12 cm.

4.



Using cosine rule,

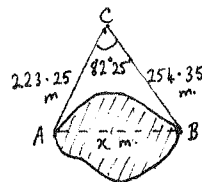
$$x^2 = 50^2 + 70^2 - 2 \times 50 \times 70 \cos 54^\circ$$

$$\therefore x \approx 57.319$$

Distance between rabbit holes

is approx. 57 m.

5.



Using cosine rule,

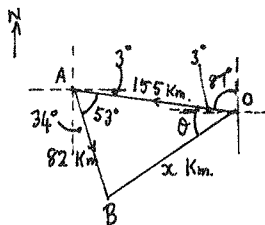
$$x^2 = 223.25^2 + 254.35^2 - 2 \times 223.25 \times 254.35 \cos 82.25^\circ$$

$$\therefore x \approx 315.5$$

Width (length) of lake is approx.

315.5 m.

6.



(a)

Using cosine rule,

$$x^2 = 155^2 + 82^2 - 2 \times 155 \times 82 \cos 53^\circ$$

$$\therefore x \approx 124.301$$

Distance of landing place from starting point is approx. 124.3 Km.

(b) Using sine rule,

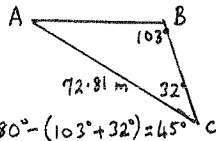
$$\frac{\sin \theta}{82} = \frac{\sin 53^\circ}{124.301}$$

$$\therefore \theta \approx 31.7929^\circ$$

Bearing of landing place, B, from starting point, O, is

W. $(31.79 - 3)^\circ$ S. i.e. W. $28^\circ 47' 5''$ S.EXERCISES 16.6

1.



$$A = 180^\circ - (103^\circ + 32^\circ) = 45^\circ$$

Using sine rule,

$$\frac{c}{\sin 32^\circ} = \frac{72.81}{\sin 103^\circ}$$

$$\therefore c \approx 39.598$$

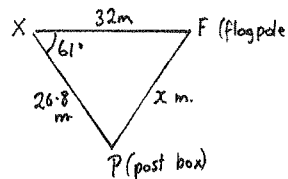
Using sine rule again,

$$\frac{a}{\sin 45^\circ} = \frac{72.81}{\sin 103^\circ}$$

$$\therefore a \approx 52.839$$

Required sides are 39.60 m and 52.84 m.

2.



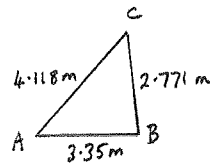
Using cosine rule,

$$x^2 = 32^2 + 26.8^2 - 2 \times 32 \times 26.8 \cos 61^\circ$$

$$\therefore x \approx 30.178$$

Distance between flagpole and post box is approx. 30.2 m.

3.



Using cosine rule,

$$\cos B = \frac{3.35^2 + 2.771^2 - 4.118^2}{2 \times 3.35 \times 2.771}$$

$$\therefore B \approx 83.9926^\circ \approx 84^\circ \text{ (to nearest degree)}$$

Using sine rule,

$$\frac{\sin A}{2.771} = \frac{\sin 83.9926^\circ}{4.118}$$

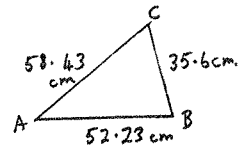
$$\therefore A \approx 42.0057^\circ \approx 42^\circ \text{ (to nearest degree)}$$

(since A is not obtuse)

$$C = 180^\circ - (84^\circ + 42^\circ)$$

$$= 54^\circ \text{ (to nearest degree)}$$

4.



Smallest angle is angle A, opposite shortest side.

Using cosine rule,

$$\cos A = \frac{58.43^2 + 52.23^2 - 35.6^2}{2 \times 58.43 \times 52.23}$$

$$\therefore A \approx 37^\circ \text{ (to nearest degree)}$$