

Advanced Trigonometry - Lesson 1

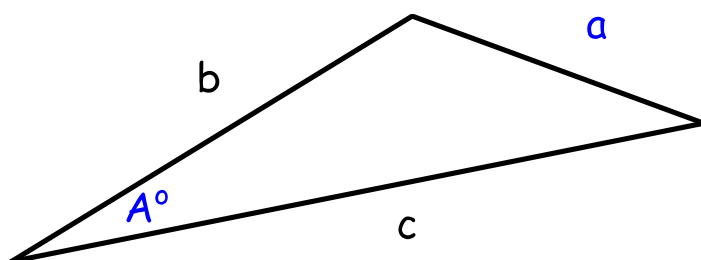
Cosine Rule (Length)

LI

- Use the Cosine Rule to find a missing length in any triangle.

SC

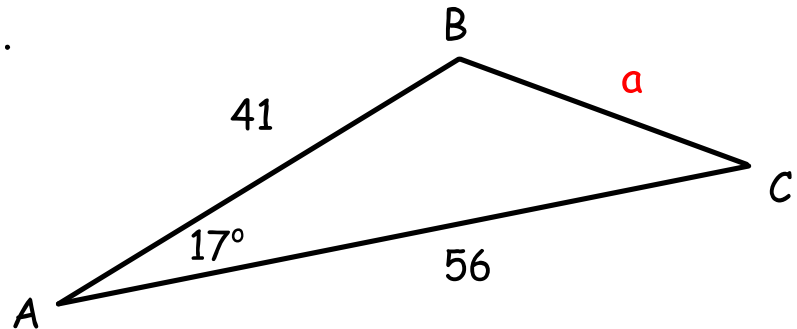
- Use a calculator properly.

Cosine Rule

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

Example 1

Calculate a to 1 d.p. .



$$A^\circ = 17^\circ, a =$$

$$B^\circ =, b = 56$$

$$C^\circ =, c = 41$$

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

$$a^2 = 56^2 + 41^2 - (2 \times 56 \times 41 \times \cos 17^\circ)$$

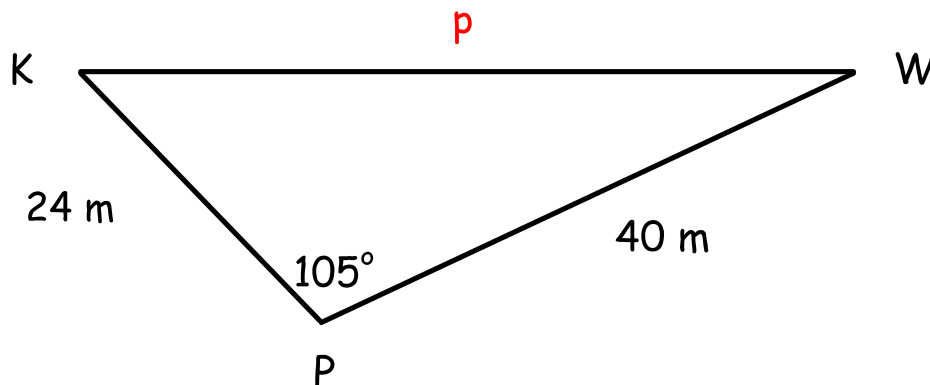
$$a^2 = 3136 + 1681 - (4391.35\dots)$$

$$a^2 = 425.64\dots$$

$$a = 20.6$$

Example 2

Calculate p to 2 d.p. .



$$P^\circ = 105^\circ, \quad p =$$

$$K^\circ =, \quad k = 40$$

$$W^\circ =, \quad w = 24$$

$$p^2 = w^2 + k^2 - 2 w k \cos P^\circ$$

$$p^2 = 24^2 + 40^2 - (2 \times 24 \times 40 \times \cos 105^\circ)$$

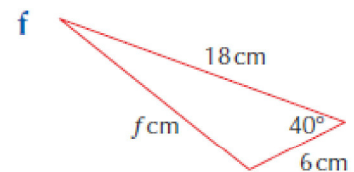
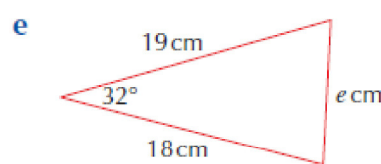
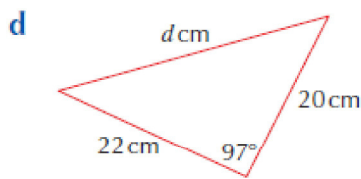
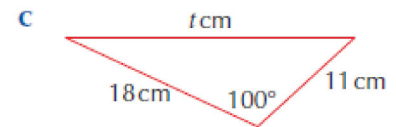
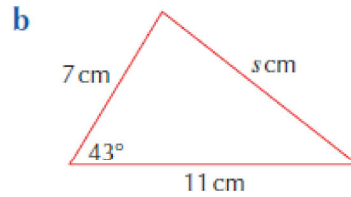
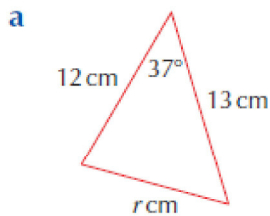
$$p^2 = 576 + 1600 - (-496.93 \dots)$$

$$p^2 = 2672.93 \dots$$

$$p = 51.70 \text{ m}$$

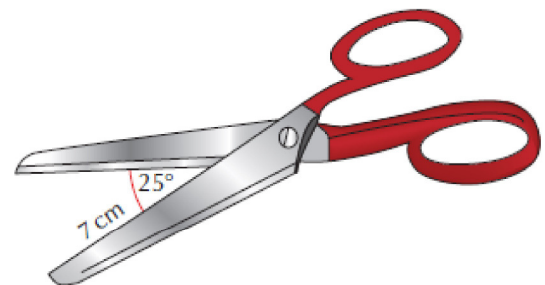
Questions

1 Calculate the length of the missing side in each triangle, giving your answer to 2 decimal places.

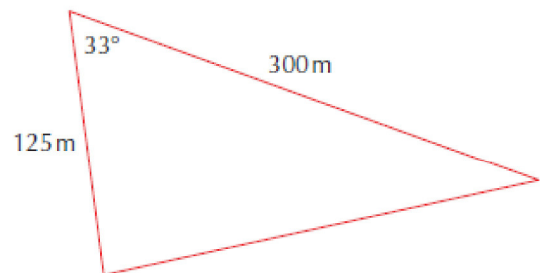


2 The equal sides of an isosceles triangle measure 6 cm. The angle between them is 40° . Calculate the size of the third side giving your answer to 1 decimal place.

3 A pair of scissors is shown. Calculate the distance between the points of the scissors.

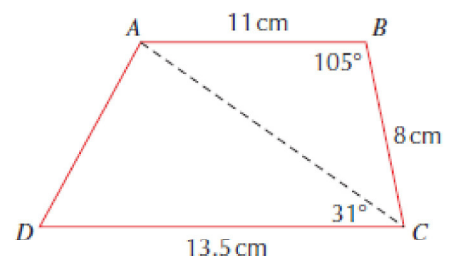


4 A farmer wants to fence a field in the shape of a triangle as shown. The cost of fencing is £6.50/m. How much will it cost to fence the whole perimeter of the field?



5 The diagram shows a trapezium.

- a** Calculate the length of side AC to 1 decimal place.
- b** Use your answer in **a** to calculate the length of AD to 1 decimal place.



Answers

- 1** **a** 7.99 cm
 b 7.57 cm
 c 22.67 cm
 d 31.48 cm
 e 10.24 cm
 f 13.95 cm
- 2** 4.1 cm
- 3** 3 cm
- 4** £4106
- 5** **a** 15.2 cm
 b 7.8 cm