

# 3.1 Basic Trigonometry

## Question Paper

Course	CIEAS Maths
Section	3. Trigonometry
Topic	3.1 Basic Trigonometry
Difficulty	Very Hard

**Time allowed:** 70  
**Score:** /51  
**Percentage:** /100

**Question 1**

An isosceles triangle has side lengths 7.3 cm and 9.8 cm. Calculate the difference between the two possible smallest angles.

[4 marks]

**Question 2a**

A triangle  $ABC$  has side lengths  $AB = 3x$  cm,  $BC = 5x$  cm and  $AC = 6x$  cm.

(a) Calculate the size of the angle  $BAC$  to two decimal places.

[2 marks]

**Question 2b**

(b) Given that the total perimeter of the triangle is 37.8 cm, find the area of the triangle, correct to three significant figures.

[4 marks]

**Question 3a**

In a triangle  $ABC$ ,  $AB = 2x$  cm,  $BC = 10$  cm and  $AC = (20 - 2x)$  cm, angle  $ABC = \theta^\circ$ .

(a) Show that  $\cos \theta = \frac{4x - 15}{2x}$ .

[2 marks]

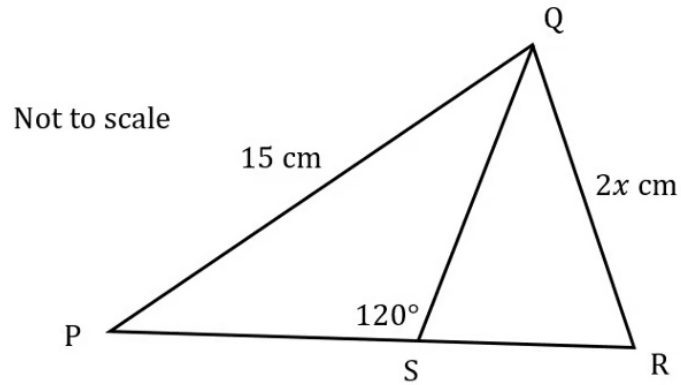
**Question 3b**

(b) Given that  $\cos \theta = -\frac{1}{2}$ , find the area of the triangle.

[4 marks]

**Question 4a**

Triangle  $PSQ$  and  $SQR$  are such that  $PS = SQ = QR$ . Sides  $PQ = 15$  cm and  $QR = 2x$  cm. Angle  $PSQ = 120^\circ$ .



(a) Calculate the exact value of  $x$ .

[3 marks]

**Question 4b**

(b) Calculate the area of the triangle  $PQR$ . Leaving your answer in surd form.

[2 marks]

**Question 5**

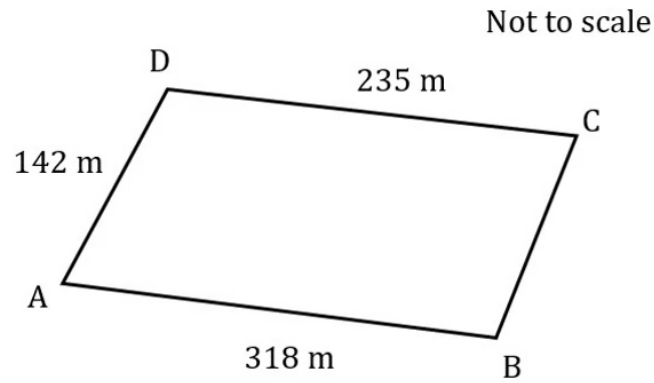
An artist is designing a triangular sculpture, made using three equal lengths of metal piping. When laid flat the sculpture covers  $21.8 \text{ m}^2$ .

Calculate the total length of metal piping needed. Giving your answer to the nearest cm.

[5 marks]

**Question 6**

Unicorns are kept in a field as shown in the diagram below. The angle between fence  $AB$  and  $AD$  is  $92^\circ$ .  $AB$  and  $CD$  are parallel.



To be happy unicorns need at least  $2222 \text{ m}^2$  each. Calculate the maximum number of unicorns that can happily be kept in the field.

[9 marks]

**Question 7a**

An emergency call is picked up by an ambulance and a police car about an accident. The police car is 15 miles due east of the ambulance and on a bearing of  $038^\circ$  from the accident. The ambulance is on a bearing of  $325^\circ$  from the accident.

- (a) If both vehicles take the shortest distance to drive to the accident who will get there first? You must show all working.

[4 marks]

**Question 7b**

- (b) State one assumption you have made for your answer in part (a).

[1 mark]

**Question 8**

A triangle  $ABC$  has sides  $AB = x$  cm,  $BC = (4 - x)$  cm, angle  $BAC = \theta$  and angle  $BCA = 30^\circ$ .

Given that  $\sin \theta = \frac{1}{\sqrt{2}}$ , show that  $x = 4(\sqrt{2} - 1)$ .

[5 marks]

**Question 9**

A triangle  $ABC$  has sides  $AB = 3x$  cm,  $AC = (x + 5)$  cm and angle  $BAC = 150^\circ$ .

The area of the triangle is  $7\frac{1}{4}$  cm<sup>2</sup>.

Find the ratio of the angles of the triangle, to the nearest degree.

Leave your answer in simplest form.

[6 marks]



