



Trigonometric Ratios

Questions

Suitable for:

Pearson Edexcel International A-Level (iAL) — Pure Mathematics 1



Question 1

The curve C has equation

$$y = \cos\left(x - \frac{\pi}{6}\right), \quad 0 \leq x \leq 2\pi$$

(a) In the space below, sketch the curve C.

(2 marks)

(b) Write down the exact coordinates of the points at which C meets the coordinate axes.

(3 marks)

(c) Solve, for x in the interval $0 \leq x \leq 2\pi$,

$$\cos\left(x - \frac{\pi}{6}\right) = \frac{1}{\sqrt{2}}$$

giving your answers in the form $k\pi$, where k is a rational number.

(4 marks)

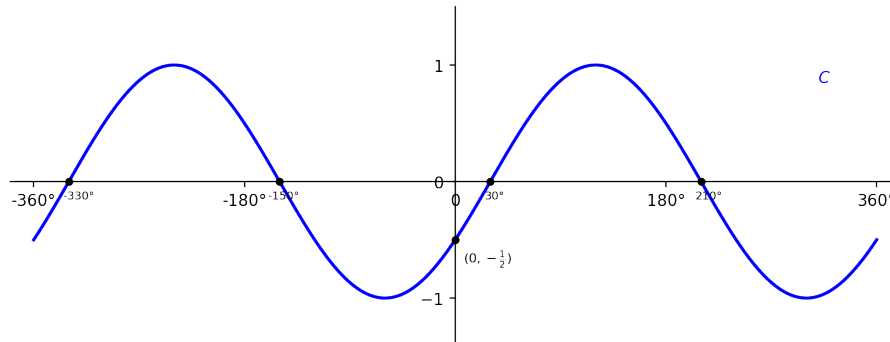
Total for question = 9 marks





Question 2

Figure 1 shows a sketch of the curve C with equation $y = \sin(x - 30^\circ)$, $-360^\circ \leq x \leq 360^\circ$.



(a) Write down the exact coordinates of the points at which C meets the two coordinate axes.

(3 marks)

(b) Solve, for $-360^\circ \leq x \leq 360^\circ$,

$$4\sin(x - 30^\circ) = \sqrt{6} - \sqrt{2}$$

showing each stage of your working.

(5 marks)

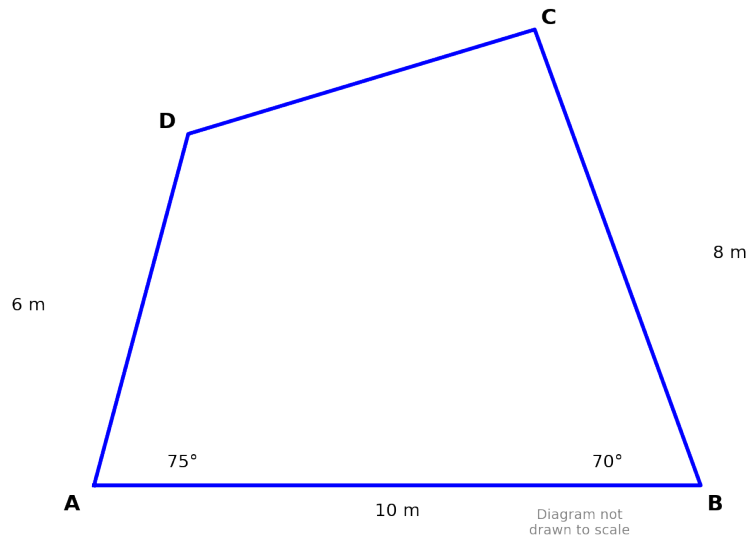
Total for question = 8 marks



Question 3

Figure 2 shows a plan of a garden, $ABCD$, in the shape of a quadrilateral.

Given $AB = 10$ m, $BC = 8$ m, $AD = 6$ m, angle $ABC = 70^\circ$ and angle $DAB = 75^\circ$



(a) Find the length of BD , in m, giving your answer to 2 decimal places.

(2 marks)

(b) Find, making your method clear, the area of the garden $ABCD$. Give your answer to the nearest m^2 .

(6 marks)

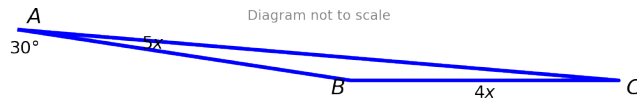
Total for question = 8 marks



Question 4

Figure 2 shows a sketch of a triangle ABC .

Given that $AB = 5x$, $BC = 4x$ and angle $BAC = 30^\circ$



(a) Show that

$$\sin ACB = \frac{5}{8}$$

(2 marks)

Given that angle ACB is obtuse,

(b) find the size of angle ABC , giving your answer in degrees, to 2 decimal places.

(2 marks)

Given further that the area of triangle ABC is 20,

(c) find the value of x to 2 decimal places,

(3 marks)

(d) find the length of side AC to 2 decimal places.

(2 marks)

Total for question = 9 marks



Question 5

In a parallelogram $ABCD$,

- side AB has length 7 cm
- side BC has length 5 cm
- angle CAB is 20°

(a) Find the possible sizes of angle ABC , giving each answer, in degrees, to one decimal place.

(4 marks)

Given that angle ABC is obtuse, find

(b) the length of diagonal AC , in cm, to 2 decimal places,

(2 marks)

(c) the area of the parallelogram $ABCD$, in cm^2 , to 3 significant figures.

(2 marks)

Total for question = 8 marks



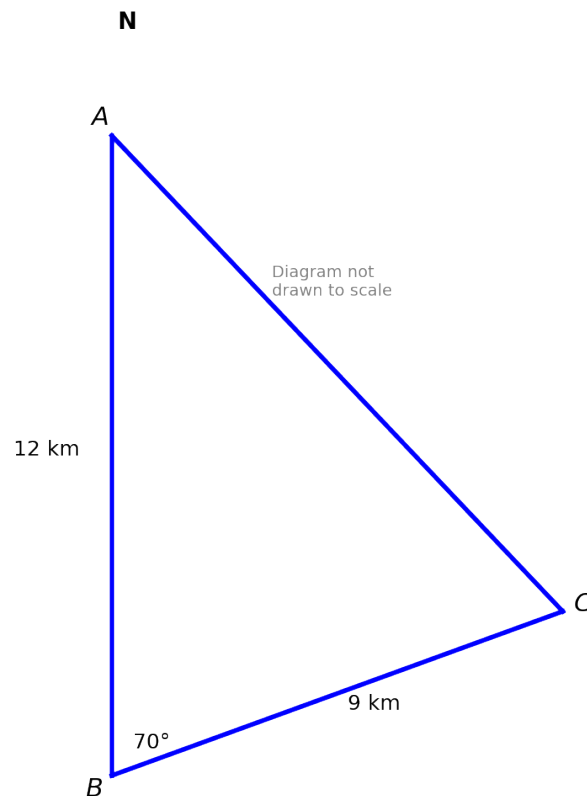


Question 6

Figure 1 shows the position of three stationary boats A , B and C , which are assumed to be in the same horizontal plane.

Boat A is 12 km due north of boat B .

Boat C is 9 km on a bearing of 070° from boat B .



(a) Find the distance of boat C from boat A , giving your answer to the nearest 10 metres.

(3 marks)

(b) Find the bearing of boat C from boat A , giving your answer to one decimal place.

(3 marks)

Total for question = 6 marks

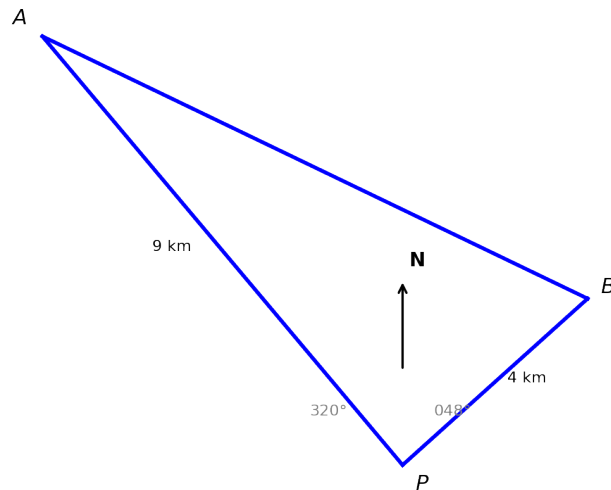


Question 7

Figure 4 shows the position of two stationary boats, A and B , and a port P , which are assumed to be in the same horizontal plane.

Boat A is 9 km on a bearing of 320° from port P .

Boat B is 4 km on a bearing of 048° from port P .



Not to scale

(a) Show that angle APB is 88° .

(1 marks)

(b) Find the distance of boat B from boat A , giving your answer to one decimal place.

(2 marks)

(c) Find the bearing of boat B from boat A , giving your answer to the nearest degree.

(4 marks)

Total for question = 7 marks