

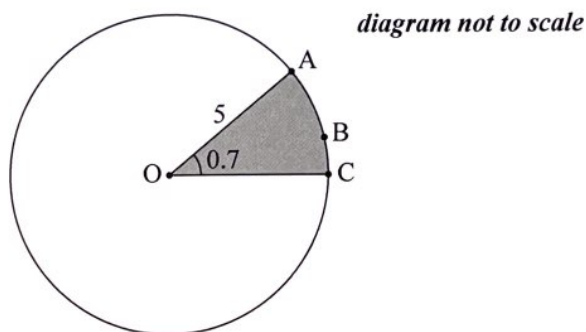
Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. In particular, solutions found from a graphic display calculator should be supported by suitable working, for example if graphs are used to find a solution, you should sketch these as part of your answer. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.

SECTION A

Answer **all** questions in the boxes provided. Working may be continued below the lines if necessary.

1. [Maximum mark: 6]

The following diagram shows a circle with centre O and radius 5 cm.



The points A, B and C lie on the circumference of the circle, and  $\angle AOC = 0.7$  radians.

(a) (i) Find the length of the arc ABC.

(ii) Find the perimeter of the shaded sector.

[4]

(b) Find the area of the shaded sector.

[2]

$$(a) i) l = 5 \cdot 0.7 = 3.5 \text{ cm}$$

$$ii) P = 3.5 + 2(5) = 13.5 \text{ cm} \text{ (This question continues on the following page)}$$

$$(b) A = 5^2 \pi \cdot \frac{0.7}{2\pi} = 8.75 \text{ cm}^2$$



5. [Maximum mark: 7]

In triangle ABC,  $AB = 6\text{ cm}$  and  $AC = 8\text{ cm}$ . The area of the triangle is  $16\text{ cm}^2$ .

(a) Find the two possible values for  $\hat{A}$ .

[4]

(b) Given that  $\hat{A}$  is obtuse, find BC.

[3]

(a)

$$A = \frac{1}{2}(6)(8) \sin A = 16$$

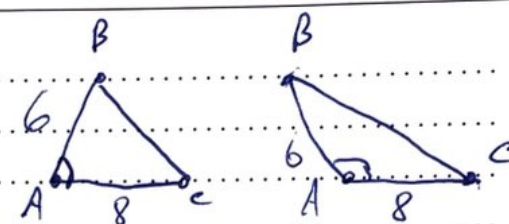

$$\sin A = \frac{2}{3}$$

$$A = \sin^{-1}\left(\frac{2}{3}\right)$$

$$= 0.729728... \text{ radians } (41.8^\circ)$$

$$\approx 0.730$$

$$\pi - 0.7297... = 2.41186... (138^\circ)$$

$$\approx 2.41 \text{ radians}$$



(b)

$$BC^2 = 6^2 + 8^2 - 2(6)(8) \cos 2.41$$

$$= 171.554...$$

$$BC = 13.0979...$$

$$\approx 13.1 \text{ cm}$$


5. [Maximum mark: 7]

Given that  $\sin x = \frac{3}{4}$ , where  $x$  is an obtuse angle, find the value of

No Calculator

(a)  $\cos x$ ;

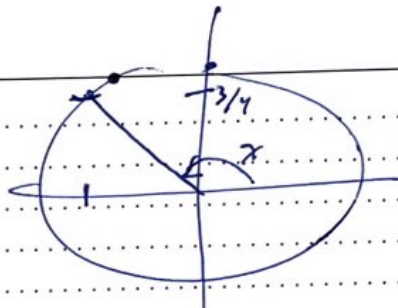
[4]

(b)  $\cos 2x$ .

[3]

$$(a) \quad 1 - \left(\frac{3}{4}\right)^2 = \frac{7}{16}$$

$$\cos x = -\frac{\sqrt{7}}{4}$$



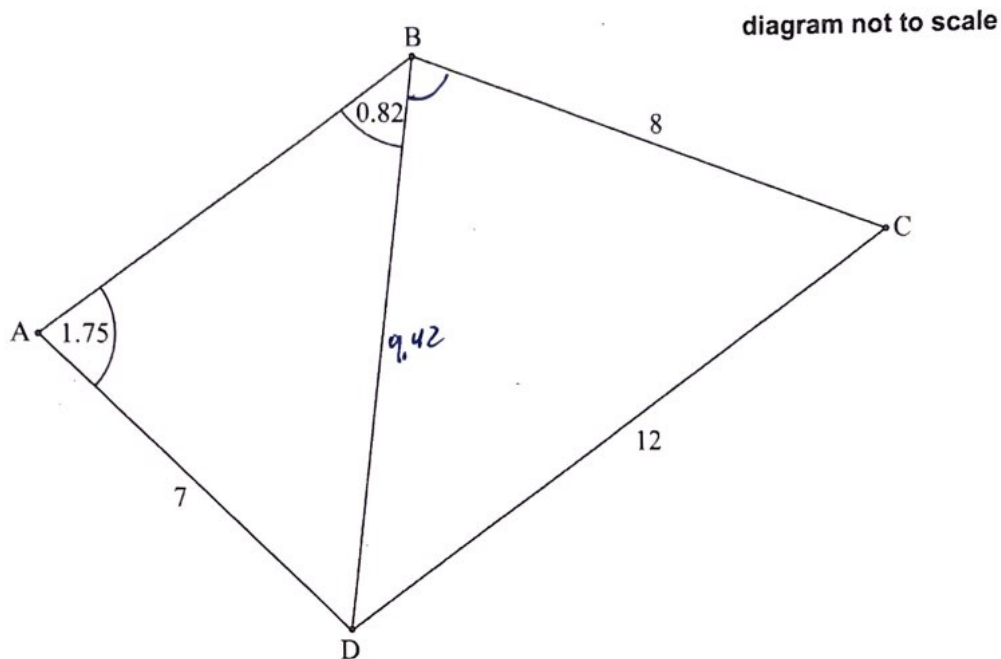
$$(b) \quad \cos 2x = 1 - 2\left(\frac{3}{4}\right)^2$$

$$= -\frac{1}{8}$$



2. [Maximum mark: 6]

The following diagram shows a quadrilateral ABCD.



$AD = 7 \text{ cm}$ ,  $BC = 8 \text{ cm}$ ,  $CD = 12 \text{ cm}$ ,  $\hat{DAB} = 1.75 \text{ radians}$ ,  $\hat{ABD} = 0.82 \text{ radians}$ .

(a) Find BD. [3]

(b) Find  $\hat{DBC}$ . [3]

(a)  $\frac{BD}{\sin 1.75} = \frac{7}{\sin 0.82}$

$BD = \frac{7 \sin 0.82}{\sin 1.75} \approx 9.42$

(b)  $\cos B = \frac{8^2 + 9.42^2 - 12^2}{2(8)(9.42)} = 0.058047...$

$B = \cos^{-1}(0.058047...) \approx 1.51272... \approx 1.51 \text{ radians}$

