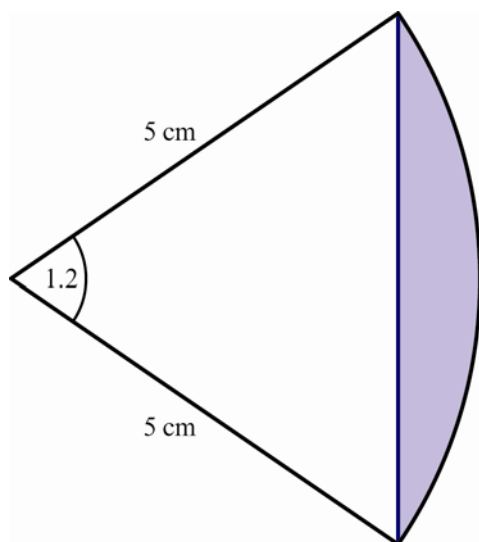


**Revision: Geometry (Topics 3 & 4)****Coursebook chapters: 8–11**

1. Find the area of the shaded region.



*(accessible to students on the path to grade 3 or 4) [4 marks]*

2. Do not use a calculator to answer this question.

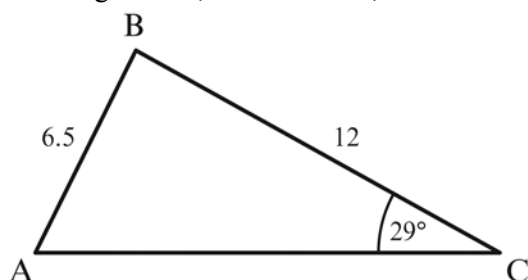
Find the exact solutions of the equation  $\sin 2\theta = \sqrt{3} \cos 2\theta$  for  $0 \leq \theta \leq 180^\circ$ .

*(accessible to students on the path to grade 3 or 4) [5 marks]*

3. Find the angles of the triangle with vertices  $A(4, 6, 2)$ ,  $B(1, 1, 2)$  and  $C(0, -1, 3)$ . Give your answers correct to the nearest degree.

*(accessible to students on the path to grade 3 or 4) [9 marks]*

4. In triangle ABC,  $AB = 6.5$  cm,  $BC = 12$  cm and  $\hat{C} = 29^\circ$ .

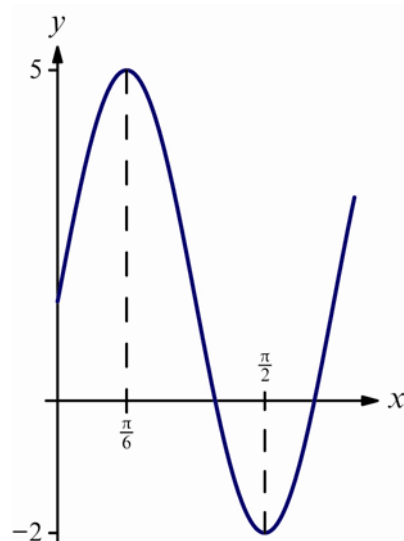


Find the two possible values of  $\hat{A}$ .

*(accessible to students on the path to grade 5 or 6) [5 marks]*

**5. Do not use a calculator to answer this question.**

The graph of the function  $f(x) = A \sin(kx) + B$  is shown below.



Find the values of  $k$ ,  $A$  and  $B$ .

*(accessible to students on the path to grade 3 or 4) [5 marks]*

**6. Do not use a calculator to answer this question.**

Solve the equation  $\cos(2x + 30^\circ) = \frac{1}{2}$  for  $0^\circ \leq x \leq 360^\circ$ .

*(accessible to students on the path to grade 5 or 6) [5 marks]*

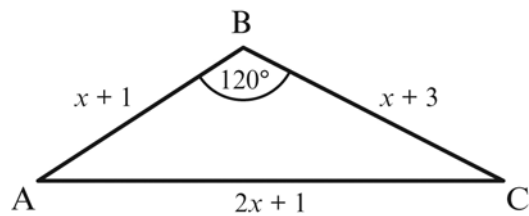
**7. Do not use a calculator to answer this question.**

(a) Given that  $\cos 2x - 3 \sin x + 1 = 0$ , show that  $2 \sin^2 x + 3 \sin x - 2 = 0$ .

(b) Hence solve the equation  $\cos 2x - 3 \sin x + 1 = 0$  for  $x \in [0, 2\pi]$ .

*(accessible to students on the path to grade 5 or 6) [7 marks]*

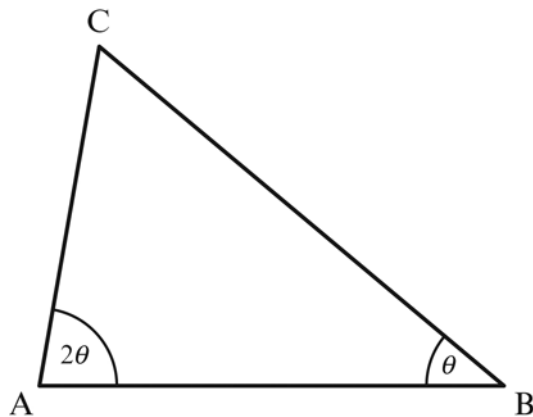
8. The triangle in the diagram has sides  $AB = x + 1$ ,  $BC = x + 3$ , and  $CA = 2x + 1$  and angle  $\hat{B} = 120^\circ$ .



Find the value of  $x$ .

*(accessible to students on the path to grade 5 or 6) [6 marks]*

9. Triangle ABC has  $\hat{A} = 2\theta$ ,  $\hat{B} = \theta$  and  $BC : AC = 5 : 4$ .



- Find the exact value of  $\cos \theta$ .
- Hence find the angles of the triangle.

*(accessible to students on the path to grade 7) [9 marks]*

10. Line  $l_1$  has equation  $\mathbf{r} = (6\mathbf{i} - 7\mathbf{j} - 7\mathbf{k}) + s(2\mathbf{i} + 5\mathbf{j} + 3\mathbf{k})$ . Line  $l_2$  passes through the origin and the point  $B(4, -1, -2)$ . The two lines intersect at point A.

(a) Write down a vector equation of  $l_2$ .

*(accessible to students on the path to grade 3 or 4)*

(b) Find the coordinates of A.

*(accessible to students on the path to grade 5 or 6)*

(c) Find the angle between  $l_1$  and  $l_2$ .

*(accessible to students on the path to grade 3 or 4)*

(d) Find the distance AB, and hence find the perpendicular distance from B to  $l_1$ .

*(accessible to students on the path to grade 7)*

*[12 marks]*

11. Do not use a calculator to answer this question.

Given that  $\theta \in \left(0, \frac{\pi}{2}\right)$  and that vectors  $\begin{pmatrix} \cos \theta \\ \sin \theta \\ -\sin \theta \end{pmatrix}$  and  $\begin{pmatrix} \cos \theta \\ -\sin \theta \\ \cos \theta \end{pmatrix}$  are perpendicular,

(a) Show that  $\tan 2\theta = 2$ .

(b) Hence find the exact value of  $\tan \theta$ .

*(accessible to students on the path to grade 7) [9 marks]*