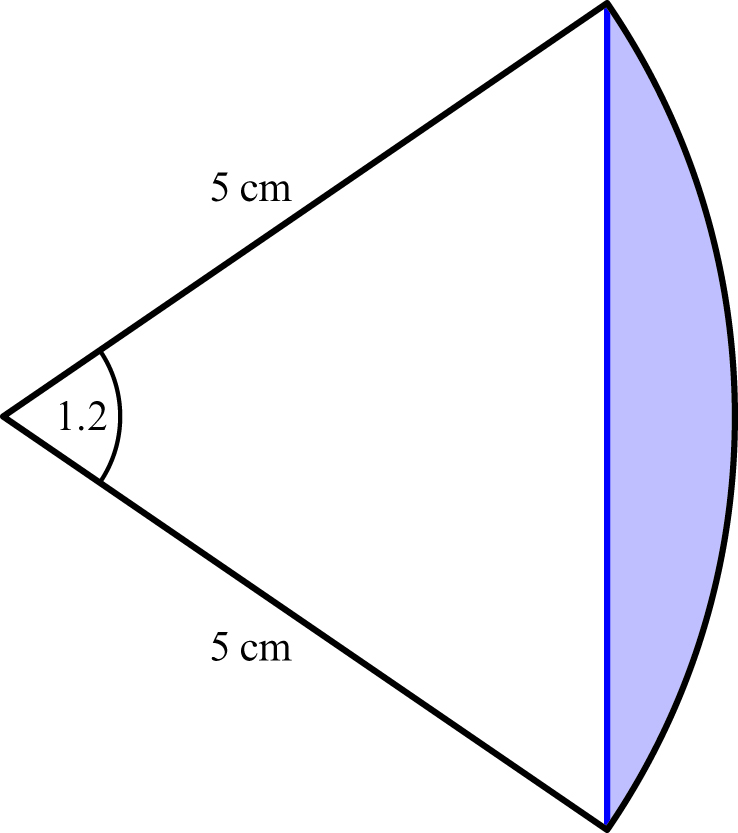
# Revision: Geometry (Topics 3 & 4)

**Coursebook chapters: 9–14**

1. Find the area of the shaded region.



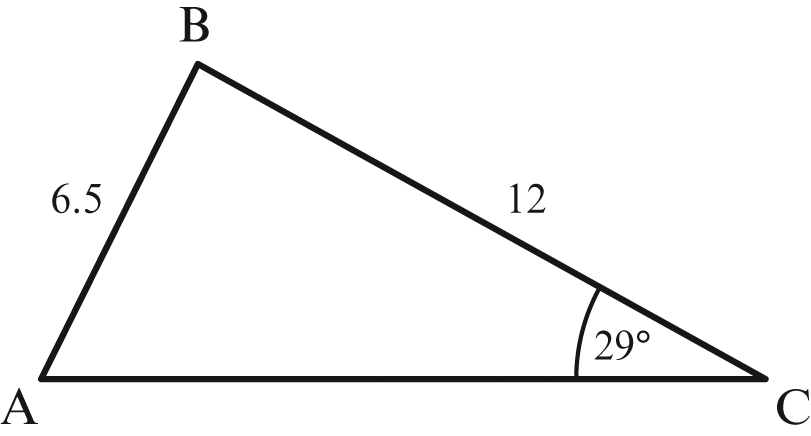
*(accessible to students on the path to grade 3 or 4) [4 marks]*

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

Find the exact solutions of the equation sin 2*θ* = cos 2*θ* for 0 ≤ θ ≤ 180°.

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

**3.** In triangle ABC, AB = 6.5 cm, BC = 12 cm and  = 29°.



Find the two possible values of.

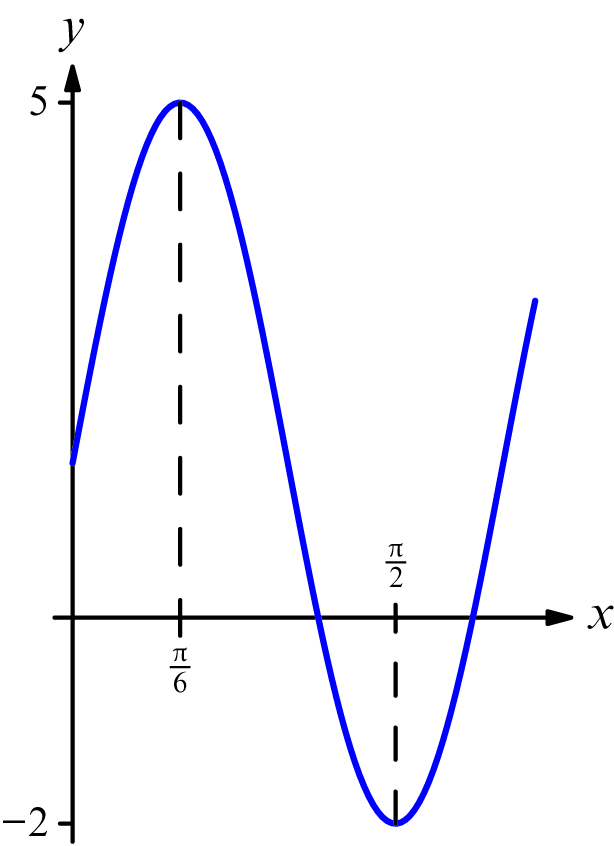
*(accessible to students on the path to grade 3 or 4) [5 marks]*

**4.** 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]*

**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(2*x* + 30°) =  for 0° ≤ *x* ≤ 360°.

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

**7.** Find the coordinates of the point where the line with Cartesian equation  = *z* – 4 intersects the plane with equation 4*x* – *y* + 2*z* = 7.

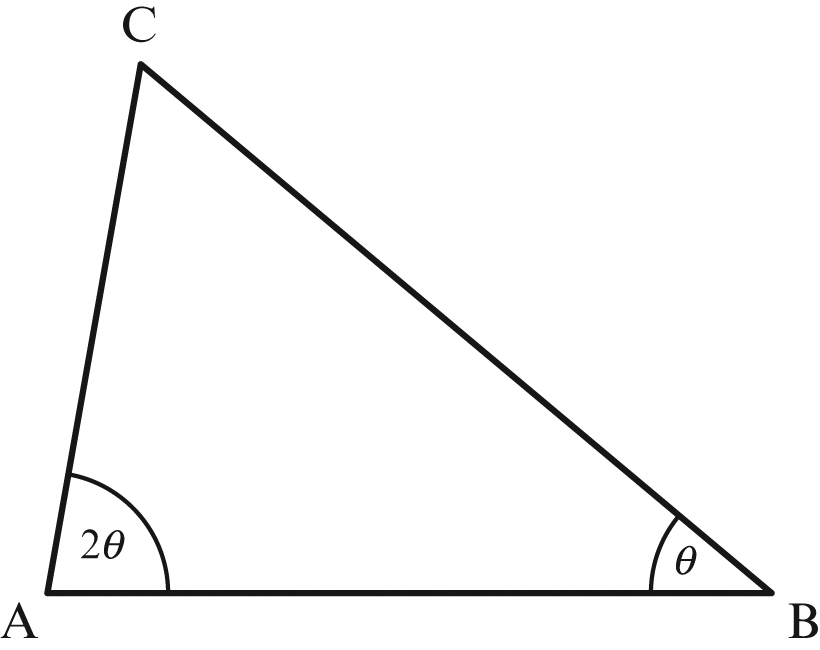
*(accessible to students on the path to grade 5 or 6) [5 marks]*

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

Solve the equation tan2 *x* – sec *x* – 1 = 0 for *x* ∈ [0, 2*π*].

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

**9.** Triangle ABC has  = 2*θ*,  = *θ* and BC : AC = 5 : 4.



(a) Find the exact value of cos *𝜃*

(b) Hence find the angles of the triangle.

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

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

(a) Expresscos *x* – sin *x* in the form *R* cos(*x* + *θ*) where *R* > 0 and *θ* ∈ .

(b) State the maximum value of .

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

**11.** Three planes have equations 4*x* – *y* + *z* = 8, *x* + *y* – 2*z* = 3 and 6*x* + *y* – 3*z* = *a*.

(a) Find the value of *a* for which the intersection of the three planes is a straight line.

(b) Find the equation of this line.

*(accessible to students on the path to grade 5 or 6) [8 marks]*

**12.** Line l1 has equation ***r*** = (6***i*** − 7***j*** − 7***k***) + *s*(2***i*** + 5***j*** + 3***k***). Line l2 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 l2.

(b) Find the coordinates of A.

(c) Find the angle between l1 and l2.

*(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 l1.

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

*[12 marks]*

**13.** Given that *A* = arcsin  find the exact value of cos *A*.

*(accessible to students on the path to grade 7) [3 marks]*

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

Given that *θ* ∈  and that vectors  and  are perpendicular,

(a) Show that tan 2*θ* = 2.

(b) Hence find the exact value of tan *θ*.

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

**15.** (a) Use the formulae for sin(*A* + *B*) and sin (*A* – *B*) to show that: sin(*A* + *B*) + sin (*A* – *B*) = 2 sin *A* cos *B*.

(b) Hence show that sin *θ* + sin 3*θ =* 4 sin *θ* cos2 *θ*.

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

**16.** (a) Find the angle between the lines ***r*** = and***r*** = .

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

(b) Find the value of *k* for which the lines l1 and l2 intersect.

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

(c) (i) Calculate.

(ii) For the value of *k* found in part (b), find the Cartesian equation of the plane Π containing lines l1 and l2.

(d) Find the exact distance of the point (5, 1, 2) from Π.

*(accessible to students on the path to grade 7)[15 marks]*