

**Self-assessment: 12 Further trigonometry****1. Do not use a calculator to answer this question.**

Solve the equation  $\cos 2\theta = \sin \theta$  for  $0^\circ \leq \theta \leq 360^\circ$ .

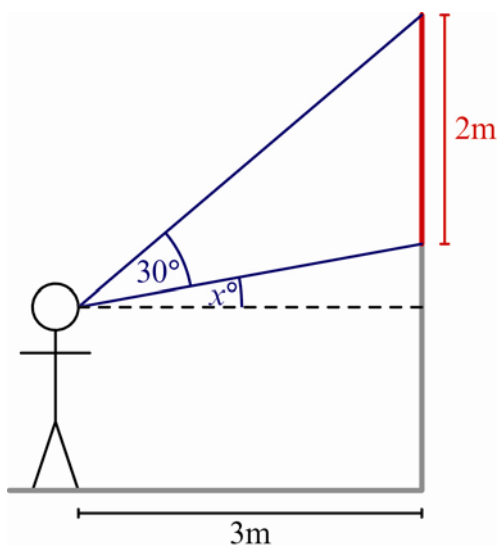
*(accessible to students on the path to grade 5 or 6) [6 marks]*

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

Solve the equation  $\cot^2 x - 3 \csc x + 3 = 0$  for  $x \in [0, \pi]$ .

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

- 3.** An observer stands  $d = 3$  m from a wall and looks at a painting. The angles of elevation of the bottom and the top of the painting are  $x^\circ$  and  $(x + 30)^\circ$ , as shown in the diagram. The height of the painting is 2 m.



(a) Show that  $3 \tan^2 x^\circ + 2 \tan x^\circ + (3 - 2\sqrt{3}) = 0$ .

(b) Find the size of the angle  $x^\circ$ .

*(accessible to students on the path to grade 5 or 6) [9 marks]*



4. Given that  $x \in (-1, 1)$ ,

- (a) Write down the value of  $\cos(\arccos x)$ .
- (b) Find an expression for  $\cos(2\arccos x)$ .
- (c) Hence find the exact solution of the equation  $\cos(\arccos x) = \cos(2\arccos x)$ .

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