**Self-assessment: 12 Further trigonometry**

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

Solve the equation cos 2*θ* = sin *θ* for 0° ≤ *θ* ≤ 360°.

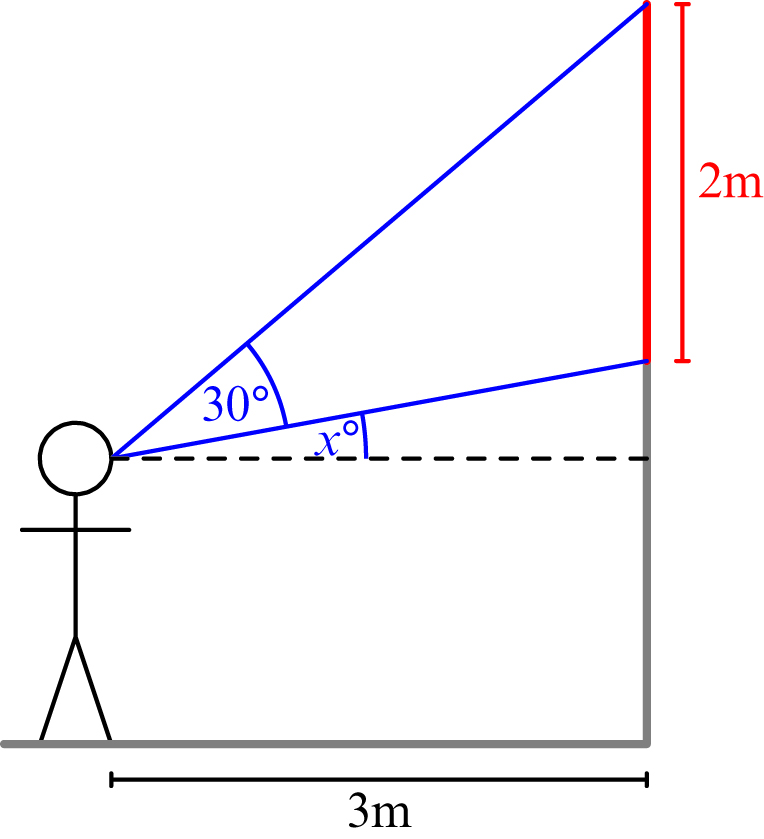
*(accessible to students on the path to grade 5 or 6) [6 marks]*

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

Solve the equation cot2 *x* – 3 csc *x* + 3 = 0 for *x* ∈ [0, *π*].

*(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*° and (*x* + 30)°, as shown in the diagram. The height of the painting is 2 m.



(a) Show that 3 tan2 *x*° + 2 tan *x*° + (3 − 2) = 0.

(b) Find the size of the angle *x*°.

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

**4.** Given that *x* ∈ (−1, 1),

(a) Write down the value of cos(arccos *x*).

(b) Find an expression for cos(2arccos *x*).

(c) Hence find the exact solution of the equation cos(arccos *x*) = cos(2arccos *x*).

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