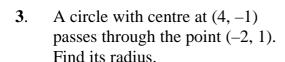# PREPARATORY PRELIMINARY MATHEMATICS
WORKSHEET #3
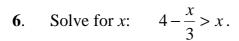
COURSE/LEVEL
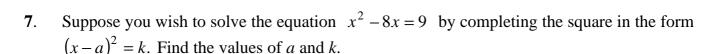NSW Secondary High School Year 11 Preliminary Mathematics.

1. In the diagram, find h correct to 3 significant figures.

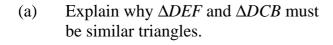**2**. Rationalise the denominator of
$$\frac{1}{3-\sqrt{5}}.$$

3. A circle with centre at $(4, -1)$ passes through the point $(-2, 1)$. Find its radius.

4. Solve $2x^2 - x - 5 = 0$ (answer in exact form).

5. Find the position of the vertex of $y = x^2 + 4x + 5$, and hence sketch the curve.

$\angle DAB = 33°$
$\angle CDB = 66°$
$CB = 20$ cm

33°

h cm

Not to scale

D

66°

Not to scale (within diagram)

C 20 cm B

A

6. Solve for x: $\quad 4 - \dfrac{x}{3} > x$.

7. Suppose you wish to solve the equation $x^2 - 8x = 9$ by completing the square in the form $(x - a)^2 = k$. Find the values of a and k.

8. Solve $x^3 - 3x^2 - x + 3 = 0$ by first factorising the *LHS* of the equation.

9. In the diagram, *ABCD* is a rectangle. Points *E* and *G* lie on sides *DC* and *BC* respectively. *F* lies on diagonal *DB* and *EFGC* is a square. *DA* and *DE* are radii of the shaded quarter circle.

(a) Explain why ΔDEF and ΔDCB must be similar triangles.

(b) Show that $\dfrac{x}{2} = \dfrac{2}{x+2}$.

(c) Show that $EC = \left(\sqrt{5} - 1\right)$ units.

A $\qquad$ H $\qquad$ B

G

F

D $\qquad$ E $\qquad$ C

← 2 units → ← x units →