

**1** Solve these quadratic equations by factors.

(a)  $2x^2 - x - 3 = 0$

(b)  $5x - x^2 = 0$

(c)  $16 + 8x + x^2 = 0$

**2** Solve by completing the square.

(a)  $x^2 - 2x = 3$

(b)  $x^2 + 2x = 1$

(c)  $2x^2 - 4x + 1 = 0$

**3** Use the quadratic formula to find the roots of the following, correct to 2 decimal places.

(a)  $2x^2 - x - 3 = 0$

(b)  $2x^2 - 3x - 4 = 0$

(c)  $5x^2 + 6x - 2 = 0$

**4** Show that the roots of  $k(x+1)(x+4) = x$  are not real if  $\frac{1}{9} < k < 1$ .

**5** Find the condition for  $x^2 + (x+c)^2 = 8$  to have equal roots?

**6** Given that  $a$  is a real number, show that the roots of the equation  $ax^2 + 3x + 3 = a$  are always real numbers.

**7** Sketch the quadratic inequality  $x^2 - x - 6 < 0$  and solve by examination.