

## Section 1: Simultaneous equations

### Exercise level 2

1. Solve the following simultaneous equations.

(i)  $7x^2 + y^2 = 64$   
 $x + y = 4$

(ii)  $3x^2 - 2y^2 = -5$   
 $y - x = 1$

(iii)  $p^2 + pq = 2$   
 $q - p = 3$

(iv)  $8a^2 - b^2 = 2$   
 $2a + b = 1$

2. Solve the following simultaneous equations.

(i)  $x + y = 9$   
 $x^2 - 3xy + 2y^2 = 0$

(ii)  $xy = 8$   
 $3x - y = 10$

(iii)  $y = 4x$   
 $3y^2 - 2xy = 160$

3. In each of the following questions, find where the two graphs cross, and show the crossing points on a sketch.

(i)  $y = 3x - 2$   
 $y = x^2 - 3x - 9$

(ii)  $y + 2x = 3$   
 $y = 6 + 4x - x^2$

4. (i) By completing the square, find the coordinates of the vertex of the graph  $y = x^2 + x + 1$ .

(ii) By putting the two expressions equal to each other in a single equation, find where the two graphs below cross:

$$y = x^2 + x + 1$$

$$y = 5x - 3$$

(iii) Interpret your result by sketching the graphs.



5. The line  $y = 2x - 3$  touches the curve  $y = x^2 + kx + 6$ . Find the possible values of  $k$ .