ALGEBRA

1 Factorise

a $x^2 + 4x + 3$ **b** $x^2 + 7x + 10$ **c** $y^2 - 3y + 2$ **d** $x^2 - 6x + 9$

e $y^2 - y - 2$ **f** $a^2 + 2a - 8$ **g** $x^2 - 1$ **h** $p^2 + 9p + 14$

i $x^2 - 2x - 15$ **j** $16 - 10m + m^2$ **k** $t^2 + 3t - 18$ **l** $y^2 - 13y + 40$

m $r^2 - 16$ **n** $y^2 - 2y - 63$ **o** $121 + 22a + a^2$ **p** $x^2 + 6x - 72$

q $26 - 15x + x^2$ **r** $s^2 + 23s + 120$ **s** $p^2 + 14p - 51$ **t** $m^2 - m - 90$

2 Factorise

a $2x^2 + 3x + 1$ **b** $2 + 7p + 3p^2$ **c** $2y^2 - 5y + 3$ **d** $2 - m - m^2$

e $3r^2 - 2r - 1$ **f** $5 - 19y - 4y^2$ **g** $4 - 13a + 3a^2$ **h** $5x^2 - 8x - 4$

i $4x^2 + 8x + 3$ **j** $9s^2 - 6s + 1$ **k** $4m^2 - 25$ **l** $2 - y - 6y^2$

m $4u^2 + 17u + 4$ **n** $6p^2 + 5p - 4$ **o** $8x^2 + 19x + 6$ **p** $12r^2 + 8r - 15$

3 Using factorisation, solve each equation.

a $x^2 - 4x + 3 = 0$ **b** $x^2 + 6x + 8 = 0$ **c** $x^2 + 4x - 5 = 0$ **d** $x^2 - 7x = 8$

e $x^2 - 25 = 0$ **f** $x(x - 1) = 42$ **g** $x^2 = 3x$ **h** $27 + 12x + x^2 = 0$

i $60 - 4x - x^2 = 0$ **j** $5x + 14 = x^2$ **k** $2x^2 - 3x + 1 = 0$ **l** $x(x - 1) = 6(x - 2)$

m $3x^2 + 11x = 4$ **n** $x(2x - 3) = 5$ **o** $6 + 23x - 4x^2 = 0$ **p** $6x^2 + 10 = 19x$

q $4x^2 + 4x + 1 = 0$ **r** $3(x^2 + 4) = 13x$ **s** $(2x + 5)^2 = 5 - x$ **t** $3x(2x - 7) = 2(7x + 3)$

4 Factorise fully

a $2y^2 - 10y + 12$ **b** $x^3 + x^2 - 2x$ **c** $p^3 - 4p$ **d** $3m^3 + 21m^2 + 18m$

e $a^4 + 4a^2 + 3$ **f** $t^4 + 3t^2 - 10$ **g** $12 + 20x - 8x^2$ **h** $6r^2 - 9r - 42$

i $6x^3 - 26x^2 + 8x$ **j** $y^4 + 3y^3 - 18y^2$ **k** $m^4 - 1$ **l** $p^5 - 4p^3 + 4p$

5 Sketch each curve showing the coordinates of any points of intersection with the coordinate axes.

a $y = x^2 - 3x + 2$ **b** $y = x^2 + 5x + 6$ **c** $y = x^2 - 9$

d $y = x^2 - 2x$ **e** $y = x^2 - 10x + 25$ **f** $y = 2x^2 - 14x + 20$

g $y = -x^2 + 5x - 4$ **h** $y = 2 + x - x^2$ **i** $y = 2x^2 - 3x + 1$

j $y = 2x^2 + 13x + 6$ **k** $y = 3 - 8x + 4x^2$ **l** $y = 2 + 7x - 4x^2$

m $y = 5x^2 - 17x + 6$ **n** $y = -6x^2 + 7x - 2$ **o** $y = 6x^2 + x - 5$

6 Solve each of the following equations.

a $x - 5 + \dfrac{4}{x} = 0$ **b** $x - \dfrac{10}{x} = 3$ **c** $2x^3 - x^2 - 3x = 0$ **d** $x^2(10 - x^2) = 9$

e $\dfrac{5}{x^2} + \dfrac{4}{x} - 1 = 0$ **f** $\dfrac{x - 6}{x - 4} = x$ **g** $x + 5 = \dfrac{3}{x + 3}$ **h** $x^2 - \dfrac{4}{x^2} = 3$

i $4x^4 + 7x^2 = 2$ **j** $\dfrac{2x}{3 - x} = \dfrac{1}{x + 2}$ **k** $\dfrac{2x + 1}{x + 3} = \dfrac{2}{x}$ **l** $\dfrac{7}{x + 2} - 3x = 2$