

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 $x - 5 + \frac{4}{x} = 0$

b $x - \frac{10}{x} = 3$

c $2x^3 - x^2 - 3x = 0$

d $x^2(10 - x^2) = 9$

e $\frac{5}{x^2} + \frac{4}{x} - 1 = 0$

f $\frac{x-6}{x-4} = x$

g $x + 5 = \frac{3}{x+3}$

h $x^2 - \frac{4}{x^2} = 3$

i $4x^4 + 7x^2 = 2$

j $\frac{2x}{3-x} = \frac{1}{x+2}$

k $\frac{2x+1}{x+3} = \frac{2}{x}$

l $\frac{7}{x+2} - 3x = 2$