Factorisation

92 p 76

a) $x^2 + 8x + 16 = x^2 + 2 \times x \times 4 + 4^2 \overset{\text{IR}}{=} (x+4)^2$

b) $4x^2 - 1 = (2x)^2 - 1^2 \overset{\text{IR}}{=} (2x-1)(2x+1)$

c) $(x+1)(x+2) + (x+1)(x-5) = (x+1)\left[(x+2)+(x-5)\right]$

$= (x+1)(2x-3)$

94 p 76

a) $4x^2 - 4x + 1 = (2x)^2 - 2 \times 2x \times 1 + 1^2 = (2x-1)^2$

b) $9x^2 + 12x + 4 = (3x)^2 + 2 \times 3x \times 2 + 2^2 = (3x+2)^2$

c) $(2x+1)^2 - x^2 = \left[(2x+1)+x\right]\left[(2x+1)-x\right]$

$A^2 \quad - B^2$

$= (3x+1)(x+1)$

d) $(x+3)^2 - (2x-3)^2 = \left[(x+3)+(2x-3)\right]\left[(x+3)-(2x-3)\right]$

$A^2 \quad - \quad B^2$

$= [3x][-x+6] = 3x(-x+6)$

95 p 67

a) $\frac{1}{4}x^2 - \frac{1}{3}x + \frac{1}{9} = \left(\frac{1}{2}x\right)^2 - 2 \times \frac{1}{2}x \times \frac{1}{3} + \left(\frac{1}{3}\right)^2 = \left(\frac{1}{2}x - \frac{1}{3}\right)^2$

b) $9x^2 - 16 = (3x)^2 - 4^2 = (3x-4)(3x+4)$

c) $(2x+1)^2 - (3x+5)(2x+1) = (2x+1)(2x+1) - (3x+5)(2x+1)$

$= (2x+1)\left[(2x+1)-(3x+5)\right]$

$= (2x+1)(2x+1-3x-5)$

$= (2x+1)(-x-4)$

96 p 76

a) $(3x-1)^2-(2x+1)^2 = [(3x-1)+(2x+1)][(3x-1)-(2x+1)]$

$= (5x)(x-2) = \underline{5x(x-2)}$

b) $(x+4)^2-(2x-6)^2 = [(x+4)+(2x-6)][(x+4)-(2x-6)]$

$= \underline{(3x-2)(-x+10)}$

c) $(-2x+3)^2-\frac{1}{4}x^2 = (-2x+3)-(\frac{1}{2}x)^2 = (-2x+3+\frac{1}{2}x)(-2x+3-\frac{1}{2}$

$= \underline{(-\frac{3}{2}x+3)(3+\frac{5}{2}x)}$

d) $4(x+2)^2-9(2x-1)^2 = [2(x+2)]^2-[3(2x-1)]^2$

$= [2(x+2)+3(2x-1)][2(x+2)-3(2x-1)]$

$= \underline{(8x+1)(-4x+7)}$

97 p 76

a) $A(x) = (x-2)(2x+5)+4(x-2)(x-1) = (x-2)[(2x+5)+4(x-1)]$

$= (x-2)[2x+5+4x-4)$

$\underline{A(x) = (x-2)(6x+1)}$

b) $B(x) = (3x-4)-2(3x-4)^2 = (3x-4)[1-2(3x-4)]$

$\underline{B(x) = (3x-4)(-6x+9)}$

ou $\underline{B(x) = 3(3x-4)(3-2x)}$

c) $C(x) = x^2-2x+1-(2x-5)^2 = (x-1)^2-(2x-5)^2$

$= [(x-1)+(2x-5)][(x-1)-(2x-5)]$

$= (3x-6)(-x+4)$

$\underline{C(x) = 3(x-2)(4-x)}$

98 p 76

a) $A(x) = 4(x+1)^2 - (x-2)(2x+2) = 2\times 2(x+1)^2 - 2(x-2)(x+1)$

$= 2(x+1)\left[2(x+1) - (x-2)\right]$

$A(x) = 2(x+1)(x+4)$

b) $B(x) = (2x-7)(3x+6) - 2(2x+4)(2x-8)$

$= (2x-7)\times 3(x+2) - 2\times 2(x+2)\times 2(x-4)$

$= (x+2)\left[(2x-7)\times 3 - 8(x-4)\right]$

$B(x) = (x+2)(-2x+11)$

c) $C(x) = 9x^2 + 6x + 1 - (5x+7)(6x+2)$

$= (3x+1)^2 - (5x+7)\times 2(3x+1)$

$= (3x+1)\left[(3x+1) - 2(5x+7)\right]$

$C(x) = (3x+1)(-7x-13)$

d) $D(x) = x(6x+5) + 4(x-4)x$

$= x\left[(6x+5) + 4(x-4)\right]$

$D(x) = x(10x-11)$

99 p 76

a) $A(x) = (2x-5)^2 + (x+7)(5-2x)$

$= (2x-5)^2 + (x+7)\times(-1)(2x-5)$

$= (2x-5)\left[(2x-5) + (x+7)\times(-1)\right]$

$A(x) = (2x-5)(x-12)$

b) $B(x) = 4(3x-1)^2 - 9(x+1)^2$

$= (2(3x-1))^2 - (3(x+1))^2$

$= \left(2(3x-1) + 3(x+1)\right)\left(2(3x-1) - 3(x+1)\right)$

$B(x) = (9x+1)(3x-5)$

$C(x) = 4(4x-3)(4x-1) + 2(2-7x)(2-8x)$

$= 4(4x-3)(4x-1) + 2(2-7x)\times(-2)(4x-1)$

$= (4x-1)\left[4(4x-3) - 4(2-7x)\right]$

$= (4x-1)(44x-20)$

$C(x) = 4(4x-1)(11x-5)$