Exercise 1C

1) q) $9xy^2 + 12x^2y = 3xy(3y + 4x)$

Further examples

1) $15p^4q^5r^6 - 10p^3q^4r^3 + 20p^5q^2r^2$

$5p^3q^2r^2(3pq^3r^4 - 2q^2r + 4p^2)$

2) $6x^3y^4 + x^2y^2 = x^2y^2(6xy^2 + 1)$

Exercise 1C

2 c) $x^2 + 11x + 24$

$(x+3)(x+8)$

+1	+24
−1	−24
+2	+12
−2	−12
+3	+8
−3	−8 ✓
+4	+6
−4	−6

$(x+a)(x+b)$

$x^2 + ax + bx + ab$

$x^2 + (a+b)x + ab$

Consider $(ax+b)(cx+d)$

$= acx^2 + bcx + adx + bd$

$$= acx^2 + (bc + ad)x + bd$$

$$5x^2 + 16x + 3$$

$5 \times 3 = 15$

$+1 \quad +15$

$$5x^2 + x + 15x + 3$$

$$x(5x+1) + 3(5x+1)$$

$$(x+3)(5x+1)$$

Past x

$$15x^2 + 42x - 9$$

$$= 3(5x^2 + 14x - 3)$$

5×-3

-15

$-1 \quad +15$

$$= 3(5x^2 - x + 15x - 3)$$

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

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

Another example

$$6x^2 + 23x + 21$$

6×21

126

$+9 \quad +14$

$$6x^2 + 9x + 14x + 21$$

$$3x(2x+3) + 7(2x+3)$$

$$(3x+7)(2x+3)$$

Alternatively

$$6x^2 + 23x + 21$$

$$6x^2 + 14x + 9x + 21$$

$$2x(3x+7) + 3(3x+7)$$

$$(2x+3)(3x+7)$$

10×-12

-120

$+8 \quad -15$

$$10x^2 - 7x - 12 = 0$$

$$10x^2 + 8x - 15x - 12 = 0$$

$$2x(5x+4) - 3(5x+4) = 0$$

$$(2x-3)(5x+4) = 0$$

Either $2x - 3 = 0$ or $5x + 4 = 0$

$2x = 3$ $\quad$ $5x = -4$

$x = \frac{3}{2}$ $\quad$ $x = -\frac{4}{5}$

Exercise 1D

1) c) $x^{3/2} \times x^{5/2}$

$= x^4$

f) $3x^{0.5} \times 4x^{-0.5}$

1 $x^p \times x^q = x^{p+q}$

2 $x^p \div x^q = x^{p-q}$

3 $(x^p)^q = x^{pq}$

4 $x^1 = x$

5 $x^0 = 1$

6 $x^{-p} = \frac{1}{x^p}$

7 $x^{\frac{1}{p}} = \sqrt[p]{x}$

$= 12$

8 $x^{p/q} = \sqrt[q]{x^p} = \left(\sqrt[q]{x}\right)^p$

i) $3x^4 \times 2x^{-5}$

$= \dfrac{6}{x}$ or $6x^{-1}$

e) $\dfrac{\left(\sqrt[3]{x}\right)^2}{\sqrt{x}} = \dfrac{x^{2/3}}{x^{1/2}} = x^{\frac{1}{6}}$

2 c) $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

f) $(-5)^{-3} = \dfrac{1}{(-5)^3} = -\dfrac{1}{125}$

i) $\left(\dfrac{25}{16}\right)^{3/2} = \left(\sqrt[2]{\dfrac{25}{16}}\right)^3 = \left(\dfrac{5}{4}\right)^3 = \dfrac{125}{64}$

l) $\left(\dfrac{343}{512}\right)^{-\frac{2}{3}} = \left(\dfrac{512}{343}\right)^{2/3}$

$= \left(\sqrt[3]{\dfrac{512}{343}}\right)^2 = \left(\dfrac{8}{7}\right)^2 = \dfrac{64}{49}$