Surds ch2 + ch7

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

2. (a) $2x^{2/3} \times 3x^{-1} = 6x^{-1/3}$

   (b) $2^{40} \times 4^{30} = 2^{40} \times (2^2)^{30} = 2^{40} \times 2^{60} = 2^{100}$

3. (i) $\frac{y^9 \times y^{-3}}{y^2} = \frac{y^6}{y^2} = y^4$

   (ii) $(\sqrt{t})^3 \times \sqrt{t^5} = t^{3/2} \times t^{5/2} = t^{8/2} = t^4$

4. (i) $81 = 3^x \quad \therefore x = 4$

(ii) $81^y = 3^{1-y}$

$(3^4)^y = 3^{1-y}$

$4y = 1-y$

$5y = 1$

$y = 1/5$

5. $\frac{x^{2/3}x^{1/2}}{x^{1/6}} = \frac{x^{4/6}x^{3/6}}{x^{1/6}} = \frac{x^{7/6}}{x^{1/6}} = x$

6. (i) $\left(\frac{3}{4}\right)^{-2} = \left(\frac{4}{3}\right)^2 = \frac{16}{9} = 1\frac{7}{9}$

(ii) $\frac{(2\sqrt{x})^4}{8x} = \frac{2^4x^2}{2^3x} = 2x$

7. $(4-\sqrt{5})(3+2\sqrt{5}) = 12 + 8\sqrt{5} - 3\sqrt{5} - 10$

$= 2 + 5\sqrt{5}$

8. (a) $\sqrt{24} + 7\sqrt{54} = 2\sqrt{6} + 7\times 3\sqrt{6} = 23\sqrt{6}$

(b) $\frac{8^n \times 2^{2n}}{4^{3n}} = 2^{kn}$

$\frac{(2^3)^n \times 2^{2n}}{(2^2)^{3n}} = 2^{kn}$

$\frac{2^{5n}}{2^{6n}} = 2^{kn}$

$2^{-n} = 2^{kn}$

$\therefore k = -1$