

Methods In Algebra

Like terms can be added or subtracted, unlike terms cannot.

Index Laws

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$a^0 = 1$$

Index Meaning

+ : top of the fraction (*keep on the same side of the fraction*)

- : bottom of the fraction (*put on the other side of the fraction*)

$$x^{\frac{a}{b}} \begin{array}{l} \leftarrow \text{power} \\ \leftarrow \text{root} \end{array} = \sqrt[b]{x^a}$$

OR

$$= \left(\sqrt[b]{x}\right)^a$$

e.g. (i) $x^{-3} = \frac{1}{x^3}$

(ii) $a^5 b^{-7} = \frac{a^5}{b^7}$

$$(iii) \frac{3}{4} x^{-4} a^9 b^{-2} = \underline{\frac{3a^9}{4x^4 b^2}}$$

$$(vii) m^{\frac{27}{4}} = \underline{m^6 \sqrt[4]{m^3}}$$

$$(iv) x^{\frac{1}{4}} = \underline{\sqrt[4]{x}}$$

$$(viii) \frac{1}{2} n^{-6} p^{500} q^{-\frac{1}{28}} c^{\frac{7}{6}} r^{69} = \underline{\frac{p^{500} c^6 \sqrt{c} r^{69}}{2 n^6 \sqrt[28]{q}}}$$

$$(v) y^{\frac{2}{3}} = \underline{\sqrt[3]{y^2}}$$

$$(vi) x^{\frac{3}{2}} = \sqrt{x^3}$$

$$= \sqrt{x^2 x}$$

$$= \underline{x \sqrt{x}}$$

OR

see think

$$x^{\frac{3}{2}} = x^{1\frac{1}{2}}$$

$$= \underline{x \sqrt{x}}$$

x^1 and $x^{\frac{1}{2}}$

$$(ix) \left(\frac{2}{3}\right)^{-2} = \left(\frac{3}{2}\right)^2$$
$$= \frac{9}{4}$$

$$(x) (a^{-2} + 1)^{-1} = \frac{1}{\frac{1}{a^2} + 1}$$
$$= \frac{a^2}{1 + a^2}$$

$$(xi) \text{ Solve } 9^{4x+1} = \frac{1}{27}$$

$$3^{8x+2} = 3^{-3}$$

$$8x + 2 = -3$$

$$8x = -5$$

$$x = -\frac{5}{8}$$

**Exercise 9A; 4adim, 7ej, 8abceg, 11bfjn, 13bfjl, 15ace,
16cf, 17bf, 18ac**

Exercise 9B; 1d, 2b, 3gl, 7cg, 8gh, 14dgh, 15chj