

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

- : bottom of the fraction

$x^{\frac{a}{b}}$ ← power
← root = $\sqrt[b]{x^a}$

OR

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

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

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

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

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

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

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

OR

see think

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

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

A diagram illustrating the decomposition of the exponent 3/2. It shows the equation x^{3/2} = x^{1 1/2} at the top. Two teal arrows point from the words 'see' and 'think' above to the terms x^{3/2} and x^{1 1/2} respectively. Below this, the equation x^{3/2} = x\sqrt{x} is shown, with the term x\sqrt{x} underlined. Two orange arrows point from the terms x^1 and x^{1/2} below to the x and \sqrt{x} parts of the underlined term.

$$(vii) m^{\frac{27}{4}} = \underline{m^{64}\sqrt[4]{m^3}}$$

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

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

**Exercise 1A; 1c, 2d, 3b, 4d, 5b, 6ad, 7bc, 8a, 9b, 10d, 11cf,
12ac, 13bd, 15, 17, 18***

**Exercise 6A; 1adgi, 2behj, 3ace, 4ace, 5bdfh, 6ace, 7adgj,
8behj, 9bd**