Daily Practice   26.10.15

Q1. Solve the equation 8x + 7 = x – 35

$$7x + 7 = -35$$
$$7x = -42$$
$$x = -6$$

Q2. $1\frac{1}{3} \times \frac{2}{5}$

$$\frac{4}{3} \times \frac{2}{5} = \frac{8}{15}$$

Q3. Factorise 4x – 16y

$$4(x - 4y)$$

Q4. Find 17% of 200

10% of 200 = 200 ÷ 10 = 20   5% ⇒ 20 ÷ 2 = 10   17% ⇒ 34
1% ⇒ 10 ÷ 5 = 2

Q5. Calculate the speed Mandy is driving at if she travels 120miles in 2 and a half hours

$$S = \frac{D}{T} = \frac{120}{2.5} = 48mph$$

Today we are going to learn about scientific notation.

Homework Due!

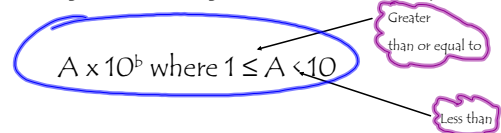Scientific Notation   26·10·15

Scientific notation (also known as standard form) is a way of writing very long numbers using the power of 10.

$10^1 =$ 10 $10^2 =$ 100 $10^5 =$ 100 000 $10^{-3} =$ 0·001
$$\frac{1}{1000} \text{ or } \frac{1}{10^3}$$

M	HTh	TTh	Th		H	T	U	•	t	h	th
10^6	10^5	10^4	10^3		10^2	10^1	10^0		10^{-1}	10^{-2}	10^{-3}

Scientific Notation

When writing numbers in scientific notation, we are writing them so that there is a single non – zero digit in front of the decimal point.

$$A \times 10^b \text{ where } 1 \leq A < 10$$

Greater than or equal to

Less than

For numbers greater than 1, b > 0. For numbers less than 1, b < 0.

Scientific Notation

Examples: Write the following in scientific notation

(a) 48 000   (b) 3 215 000   (c) 0.00325   (d) 0.0009

4.8×10^4 3.215×10^6 3.25×10^{-3} 9×10^{-4}

★

Write the following numbers in normal form (in full)

(e) 5.1×10^3 (f) 2.83×10^{-7} (g) 1.093×10^8

$5.1 \times 10 \times 10 \times 10$ $2.83 \div 10 \div 10 \div 10$ 109 300 000
$= 5100$ $\div 10 \div 10 \div 10$
                      0.000000283

Daily Practice   27.10.15

Q1. Multiply out and simplify 7k + 4(3k – 4) + 2(2k + 2)

$$7k + 12k - 16 + 4k + 4$$
$$23k - 16 + 4$$
$$23k - 12$$

Q2. Josh puts £500 in the bank at the beginning of the year. He receives his money at the end of the year with 5% simple interest added, how much interest does he receive?

5% of 500   25   £25
20√500

Q3. Share £500 in the ratio 2:3

$\frac{2}{5} \Rightarrow 3\overline{)500}$ $\frac{100}{\times 2}$ £100 $\frac{3}{5} \Rightarrow$ $\frac{100}{\times 3}$ £300
2 + 3 = 5   £200 G   £300

Q4. Write 40% as a fraction in its simplest form

$$\frac{40}{100} = \frac{4}{10} = \frac{2}{5}$$

Q5. Calculate the length of GH

$$x^2 = 24^2 - 18^2$$
$$x^2 = 576 - 324$$
$$x^2 = 252$$
$$x = \sqrt{252} = 15.87cm \ (2d.p.)$$

24cm
H 18cm I

Today we will be continuing to practise questions on scientific notation.

Scientific Notation questi...

Ex. 5B Q5

Ex. 5D Q4, 5

Ex. 5E Q1 a, d

Q2-6

Examples:

1. The area of the surface of the Earth is about 5.095×10^9 square miles. Approximately 29.2% of this is land. How much of the surface area is land?

$$0.292 \times 5.095 \times 10^9 = 1\,487\,740\,000 \text{ sq. miles}$$
$$= 1.48774 \times 10^9$$

2. The mass of an oxygen atom is 2.7×10^{-23} grams. The mass of an electron at rest is approx. 30 000 times smaller than this. Calculate the mass of an electron at rest

$$2.7 \times 10^{-23} \div 30000$$
$$= 9 \times 10^{-28}$$

★ ☆ Success? ☆ ★

I can explain what scientific notation is and why it is used.

I can write numbers in scientific notation.

I can convert numbers in scientific notation back to normal form.

Daily Practice   28.10.15

Q1. Round 26.28 to the nearest unit   → 26

Q2. There are 3.06×10^{21} atoms in one gram of gold, how many atoms are in 500g of gold? $3.06 \times 10^{21} \times 500 = 1.53 \times 10^{24}$

Q3. What is 64.5% written as a decimal? = 0.645

Q4. Write 30 out of 70 as a percentage $30 \div 70 \times 100 = 42.8\%$

Q5. Multiply out and simplify 5(2x - 1) - 1(x - 3)
$10x - 5 \quad -x + 3$
$9x - 2$

Q6. What is the value of V if $V = p^2 - 3p$ when p = -5?
$$V = (-5)^2 - 3(-5)$$
$$V = 25 + 15$$
$$V = 40$$

Today we will be learning about indices.

Indices   28.10.15

An index (pl. indices) or power represents how many times a number is being multiplied by itself.

a^b is pronounced "a to the power of b"

$4^3 = 4 \times 4 \times 4 = 64$

Examples: Find the value of

(a) $5^3 = 5 \times 5 \times 5 = 125$ (b) $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

$2^2 \times 2^5$
$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$
$= 2^7$

$3^3 \times 3^2 \times 3^4$
$3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$
$= 3^9$

$3^3 \times 5^1 \times 3^4 \times 5^3$
$3 \times 3 \times 3 \times 5 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5$
$3^7 \times 5^4$

$a^1 \times a \times a^4 = a^6$
$a^3 \times b^3 \times a^5 \times b^4 = a^8 b^7$

$3 \times a^2 \times a^3 \times 2a^4 = 6a^9$

$3a^2 \times 2b^3 \times a \times 5b^2$
$30 a^3 10 b^5$
$30 a^3 b^5$

Laws of Indices

There are various rules that help you work out problems with indices in them.

1. Multiplying terms with powers

Multiplying terms with powers

Examples: Multiply the following

i) $b^2 \times b^3$ = b^5

ii) $5a \times 3a^{-5} \times 4a^2$ = $60a^{-2}$

iii) $3ac^2 \times 2a^3$ = $6a^4c^2$

iv) $3b^2(2b^5 + 5)$ = $6b^7 + 15b^2$

$3 \times 10^{-1} = 0.3$
$3 \times \frac{1}{10}$

4×2^{-1}
$4 \times \frac{1}{2}$

3×10^{-2}
$3 \times \frac{1}{100} = \frac{3}{100}$
=

Daily Practice   30.10.2015

Q1. Round 6177 to 1 significant figure 6000

Q2. A group of witches are ages 25, 37, 48, 43, 64, 77 and 82.
Calculate their mean age = $376 \div 7 = 53.7$ (1 d.p.)

Q3. Solve ½(7x – 1) < x + 17
$3.5x - 0.5 < x + 17$ $x < 7$
$3.5x < x + 17.5$
$-5x < 17.5$

Q4. Ghostbusters blasted the ghost population (12000) by 30% every minute for 3 minutes. How many ghosts were there after 3 mins?
$100\% - 30\% = 70\%$
$12000 \times 0.7^3 = \underline{4116 \text{ ghosts}}$

Today we will be continuing to learn how to multiply indices.

Indices

A number with a negative power is the same as 1 over the number with a positive power.

$2 \times 10^2 = 2 \times 10 \times 10$

$2 \times 10^{-2} = 2 \div 10 \div 10$
$= 2 \div 10^2 = \frac{2}{10^2}$
$= 2 \times \frac{1}{10^2}$
$= 2 \times 10^{-2}$

$\boxed{a^{-b} = \frac{1}{a^b}}$

Examples:

(a) 3^{-2} = $\frac{1}{3^2}$
$= \frac{1}{9}$

(b) 4^{-3} = $\frac{1}{4^3}$
$= \frac{1}{64}$

(c) $3a^{-4}$ = $\frac{1}{a^4}$

(d) $3a^{-5} = 3 \times a^{-5}$
$= \frac{3}{a^5}$

(e) $\frac{1}{3}a^{-4} = \frac{1}{3a^4}$
$\frac{1}{3} \times \frac{1}{a^4}$

Multiplying Numbers with powers

1. Write each of the following in its simplest index form.

(a) $3^4 \times 3^2$ = 3^6 (b) 2×2^3 = 2^4 (c) $10^5 \times 10^2$ = 10^7 (d) $8^3 \times 8^5$ = 8^8

(e) $7^6 \times 7^{-3}$ = 7 (f) $5^4 \times 5^4$ = 5^8 (g) $9^6 \times 9^2$ = 9^8 (h) $6^8 \times 6^5$ = 6^{13}

(i) $x^3 \times x^5$ = x^8 (j) $c^2 \times c^9$ = c^{11} (k) $a^2 \times a^{12}$ = a^{14} (l) $y^5 \times y^5$ = y^{10}

(m) $b^{10} \times b^{30}$ = b^{40} (n) $p \times p^9$ = p^{10} (o) $d^2 \times d^4$ = d^6 (p) $q^{11} \times q^9$ = q^{20}

2. (a) $m^3 \times m^{-5}$ (b) $x^7 \times x^{-2}$ (c) $p^{-8} \times p^5$ (d) $a^{-3} \times a^{-5}$
$m^{-2} = \frac{1}{m^2}$ x^5 $p^{-3} = \frac{1}{p^3}$ $a^{-8} = \frac{1}{a^8}$

3. (a) $3a^2 \times a^3$ (b) $4m^3 \times 2m^5$ (c) $5m^{-3} \times 2m^5$ (d) $7y^{10} \times 4y^2 \times 5y^{-3}$
$3a^5$ $8m^8$ $10m^2$ $140y^9$

(e) $-2k^2y \times 4y^2$ (f) $10k^2m^3 \times 6k^{-1}m^6$ (g) $2m^3 \times 7m^{-3} \times 4m^6 \times -5$
$-8k^2y^3$ $60k^{-1}m^9 = \frac{60m^9}{k}$ $-280m^6$

4. (i) $3a(2a + 1)$ (ii) $5a^2(6a^3 - 2a^{-2})$ (iii) $-4xy(2x^2 - 3x^5y^{-1})$
$6a^2 + 3a$ $30a^5 - 10a^0$ $-8x^3y + 12x^6y^0$

(iv) $a^{0.5}(2a^{1.5} - a^{-0.5})$ (v) $5g^2h^2(4g^{-7} - 2h^6)$ (vi) $(3^2 \times 3^3) \div (3^4 \times 3^{-1})$
$2a^2 - a^0$ $20g^{-5}h^2 - 10g^2h^8$ $3^5 \div 3^3$
$\frac{20h^2}{g^5} - 10g^2h^8$ $= 3^2$

Daily Practice   2.11.2015

Q1. Find the value of a house that was worth £48 000 and appreciated by 4.5% per annum for 22 years.

$100\% + 4.5\% = 104.5\%$ $48000 \times 1.045^{22} = £126\ 415.30$

Q2. Multiply out and simplify $2(x - 3) + 4(x + 1)$

$2x - 6 + 4x + 4 = 6x - 2$

Q3. Solve $\dfrac{x+5}{3} - \dfrac{4+2x}{4} = -1$

$\times 12 \quad \times 12$

$4(x+5) - 3(4+2x) = -12$
$4x + 20 - 12 \quad -6x = -12$
$-2x + 8 = -12$
$-2x = -20$
$x = 10$

Q4. $2\dfrac{1}{5} \div \dfrac{3}{4} = \dfrac{11}{5} \div \dfrac{3}{4} = \dfrac{11}{5} \times \dfrac{4}{3} = \dfrac{44}{15} = 2\dfrac{14}{15}$

Q5. Write 0.0000182 in scientific notation $= 1.82 \times 10^{-5}$

Today we will be learning how to divide indices.

What would you get if you divided x^3 by x^2 ?

(vi) $(3^2 \times 3^3) \div (3^4 \times 3^{-1})$

$3^5 \div 3^3 = 9$

$3^5 \div 3^3 = 3^2$

$7^8 \div 7^6 = 49 = 7^2$

$2^5 \div 2^2 = 8 = 2^3$

$a^5 \div a^2 = a^3$

$50a^5 \div 10a^2 = 5a^3$

2. Dividing Numbers with powers

$k m^a \div y m^b = (k \div y) m^{a-b}$

where k and y are constants

Dividing Numbers with powers

Examples: Simplify the following

1. $7^5 \div 7^3 = 7^2$
   or 49

2. $6m^7 \div 24m$
   $= \dfrac{m^6}{4}$ or $\dfrac{1}{4}m^6$

3. $4m^8 \div 2m^2$
   $= 2m^6$

4. $\dfrac{a^7}{a^3} = a^4$

5. $\dfrac{12h^2}{2h^{-5}} = 6h^7$

The power of zero

Any number to the power of zero is one.

$a^0 = 1$

For example: $5a^0 = 5(1) = 5$

$$\frac{m^2}{m^2} = m^0 \quad \text{or} \quad 1$$

Success?

I can multiply numbers with powers
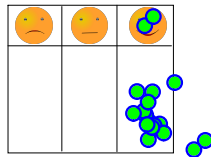
I can divide numbers with powers

Today we will be learning how to put a power to a power.

$(x^2)^2$

$x^2 \times x^2 = x^4$

$(x^2)^3$

$x^2 \times x^2 \times x^2 = x^6$

$(x^{-1})^2 = x^{-2}$

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

$(x^5)^4$

$x^5 \times x^5 \times x^5 \times x^5 = x^{20}$

$(x^{\frac{1}{2}})^2$

x^1 or x

$(2x^3)^2$

$2x^3 \times 2x^3 = 4x^6$

Dividing Numbers with powers

1. Write each of the following in its simplest index form.   From Pegasys booklet

(a) $2^8 \div 2^3 = 2^5$ (b) $5^4 \div 5^2 = 5^2$ (c) $12^9 \div 12^6 = 12^3$ (d) $7^{11} \div 7^4 = 7^7$

(e) $20^5 \div 20 = 20^4$ (f) $8^8 \div 8^4 = 8^4$ (g) $3^{18} \div 3^3 = 3^{15}$ (h) $4^{15} \div 4^{13} = 4^2$

(i) $x^7 \div x^2 = x^5$ (j) $a^9 \div a^5 = a^4$ (k) $y^{20} \div y^{10} = y^{10}$ (l) $b^4 \div b^1 = b^3$

(m) $p^{12} \div p^{11} = p^1$ (n) $c^7 \div c^7 = 1 \text{ or } c^0$ (o) $q^8 \div q^2 = q^6$ (p) $d^4 \div d = d^3$

(q) $\dfrac{x^9}{x^3} = x^6$ (r) $\dfrac{a^8}{a^2} = a^6$ (s) $\dfrac{m^{14}}{m} = m^{13}$ (t) $\dfrac{s^7}{s^7} = s^0 \text{ or } 1$

(u) $\dfrac{d^{20}}{d^{12}} = d^8$ (v) $\dfrac{y^{100}}{y^{10}} = y^{90}$ (w) $\dfrac{t^{100}}{t} = t^{99}$ (x) $\dfrac{w^{10}}{w^0} = w^{10}$

2. (a) $\dfrac{14x^7}{2x^{-3}} = 7x^{10}$ (b) $\dfrac{36x^{15}}{12x^5} = 3x^{10}$ (c) $\dfrac{6x^9}{8x^{-3}} = \frac{3}{4}x^{12}$ (d) $\dfrac{48x^9}{8x^9} = 6x^0 \text{ or } 6$

(e) $\dfrac{2x^2 \times x^3 \times 6x}{4x} = 3x^5$ (f) $\dfrac{10x^2 \times 2x^2}{10x^{-4}} = 2x^8$ (g) $\dfrac{1x}{10x^{-4}} = \frac{1}{10}x^5$

Daily Practice   3.11.2015

Q1. Calculate the value of a car that was worth £4500 and depreciated by 7% per annum for 2 years.

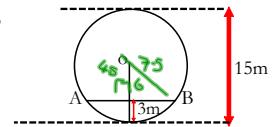$100\% - 7\% = 93\% = 0.93$

$4500 \times 0.93^2 = £3892.05$

Q2. Solve the equation $\dfrac{2x-5}{3} + \dfrac{x}{2} = 3$ $\times 6$

$2(2x-5) + 3x = 18 \Rightarrow 4x - 10 + 3x = 18$

$7x = 28$

$x = 4$

Q3. Calculate the length of AB

$x^2 = 7.5^2 - 4.5^2$

$x^2 = 36$

$x = \sqrt{36} = 6$

$AB = 6 \times 2 = 12m$

15m, 3m, 4.5, 7.5, A, B

---

3. Putting a power to a power   3.11.15

Think about what happens when you write $(2^3)^2$

$$(a^k)^b = a^{kb}$$

Examples:

(i) $(3^2)^5 = 3^{10}$ (ii) $(p^4)^8 = p^{32}$ (iii) $(4p^2)^3 = 64p^6$

(iv) $\dfrac{(p^2 \times 2p \times p^3)^5}{\cdot p^7} = \dfrac{(2p^6)^5}{p^7} = \dfrac{32p^{30}}{p^7} = 32p^{23}$

Putting a power to a power

Write each of the following in its simplest index form.

(a) $(3^2)^4 = 3^8$ (b) $(8^2)^2 = 8^4$ (c) $(10^3)^2 = 10^6$ (d) $(2^2)^5 = 2^{10}$

(e) $(4^5)^3 = 4^{15}$ (f) $(1^7)^2 = 1^{14}$ (g) $(12^3)^3 = 12^9$ (h) $(5^5)^5 = 5^{25}$

(i) $(x^4)^2 = x^8$ (j) $(y^8)^5 = y^{40}$ (k) $(a^3)^7 = a^{21}$ (l) $(m^4)^4 = m^{16}$

(m) $(b^3)^6 = b^{18}$ (n) $(p^5)^3 = p^{15}$ (o) $(k^5)^{20} = k^{100}$ (p) $(z^6)^0 = z^0 = 1$

(q) $(3x^2)^2$ (r) $(4b^3)^4$ (s) $(10a^{-2})^5$

$= 9x^4$ $256b^{12}$ $100000a^{-10}$

$$= \frac{100000}{a^{10}}$$

From Pegasys booklet

Q1. Round 41226 to 3 significant figures → 41200

Q2. Multiply out and simplify $2f - 3(f - 4)$

$2f - 3f + 12$

$-f + 12$

Q3. 45.6×500

$\begin{array}{r} \times \; 5 \\ \hline 2280 \end{array} \times 100 = 22800$

Q4. Write 6 000 000 in scientific notation

6×10^6

Q5. Solve $\dfrac{x-3}{2} + \dfrac{4x}{3} = 15$ LCM = 6

$3x - 9 + 8x = 90$

$11x = 99$

$x = 9$

Today we will be working on Problem Solving Skills.

Daily Practice   6.11.15

Q1. Write 0.0001706 in scientific notation 1.706×10^{-4}

Q2. Multiply out and simplify $7y - 2(y + 1) + 3$

$7y - 2y - 2 + 3$

$5y + 1$

Q3. Solve the inequation $2x - \dfrac{(3x-1)}{4} \le 4$ $\times 4$

$8x - (3x - 1) \le 16$

$8x - 3x + 1 \le 16$

$5x + 1 \le 16$

$5x \le 15$

$x \le 3$

Q4. $2\dfrac{1}{5} \div \dfrac{15}{8} = \dfrac{11}{5} \div \dfrac{15}{8}$

$= \dfrac{11}{5} \times \dfrac{8}{15} = \dfrac{88}{75} = 1\dfrac{13}{75}$

Q5. Calculate the value of a car that was worth £15 000 and depreciated by 2.4% per annum for 3 years

$100\% - 2.4\% = 97.6\%$

$0.976^3 \times £15000 = £13945.71$

Applying the rules of indices to questions
From Pegasys booklet

Simplify these expressions.

(a) $2a^3 \times 5a^5$ (b) $7x \times 9x^8$ (c) $12p^7 \div 4p^4$ (d) $50b^{12} \div 10b^6$
$= 10a^8$ $= 63x^9$ $= 3p^3$ $5b^6$

(e) $3y \times (2y^2)^3$ (f) $(4q^3)^2 \times 5q^4$ (g) $(4c^3)^3 \div 8c^2$ (h) $72z^{12} \div (3z^4)^2$
$= 24y^7$ $80q^{10}$ $8c^7$ $8z^4$

(i) $k^2(k^3 + k^5)$ (j) $m^5(m^2 - m^3)$ (k) $2x^4(x^3 + 3x^2)$ (l) $5a^5(2a^2 - 3a^3)$
$k^5 + k^7$ $m^7 - m^8$ $2x^7 + 6x^6$ $10a^7 - 15a^8$

(m) $\dfrac{x^5 \times x^4}{x^6} = x^3$ (n) $\dfrac{(m^5)^4}{m^6} = m^{14}$ (o) $\dfrac{5c^3 \times 4c^7}{2c^6} = 10c^4$ (p) $\dfrac{(3q^3)^2 \times 4q^4}{6q^7} = 6q^3$

(q) $\dfrac{(3xy^5)^3}{9x^2y} = 3xy^{14}$ (r) $\dfrac{(2a^2b^5)^6}{(4ab)^2} = 4a^{10}b^{28}$ (s) $\dfrac{64a^{12}b^{30}}{16a^4b^2} \cdot \dfrac{(4p^4)^3}{2p^3 \times 8p^6} = 4p^3$ (t) $\dfrac{(2ab^3)^5}{3a^2b \times 4ab^2} = \dfrac{8}{3}a^2b^{12}$

(u) $\dfrac{x^5 \times 2x^{-3} \times 4x^2}{2x^{-8}}$ (v) $\dfrac{15x^{\frac{3}{2}} \times 4x^{-1} \times 2x^{\frac{1}{2}}}{10x^{-1}}$ (w) $\dfrac{(5x^{-4} \times 6x^{-1} \times 4x^{10})^3}{4x^2}$

$\dfrac{32a^5b^{15}}{12a^3b^3}$

$= \dfrac{8}{3}a^2b^{12}$

Today we will be continuing to practise mixed questions on indices and also learn about fractional powers.
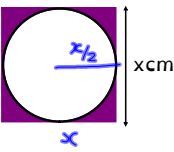
Daily Practice   9.11.15

Q1. Round 17183 to 2 significant figures

→ 17000

Q2. The diagram shows a circle inscribed within a square.
Write down an expression for the shaded area

$L \times B - \pi r^2$

$x^2 - \pi \left(\frac{x}{2}\right)^2 = x^2 - \frac{x^2 \pi}{4}$

or $x^2\left(1 - \frac{\pi}{4}\right)$

Q3. $\frac{3}{8} \times \frac{2}{5} = \frac{6}{40} = \frac{3}{20}$

x/2 | xcm

x

Today we will be learning about fractional indices.

Homework Online due 16.9.15

Q4. Solve $\frac{2x-1}{3} + \frac{30x}{10} = 18$

×30   ×30

$10(2x-1) + 3(30x) = 540$

$20x - 10 + 90x = 540$

$110x = 550$

$x = 5$

Fractional Indices   9·11·15

If a power is a fraction, the denominator is always the root and the numerator is always the power.

power → m

$$a^{\frac{m}{n}} = \sqrt[n]{a}^{\,m}$$

root

When the root is 2, this just means square root.

$\sqrt[3]{8^2}$ or $\left(\sqrt[3]{8}\right)^2$

Examples:
(i) $z^{\frac{2}{3}} = \sqrt[3]{z^2}$ or $\left(\sqrt[3]{z}\right)^2$ (ii) $a^{\frac{1}{2}} = \sqrt{a}$ (iii) $a^{\frac{1}{3}} = \sqrt[3]{a}$ (iv) $a^{\frac{5}{7}} = \sqrt[7]{a^5}$

(v) $8^{\frac{3}{2}} = \sqrt{81}^{\,3} = 729$

(vi) $b^{-\frac{1}{2}} = \frac{1}{b^{\frac{1}{2}}} = \frac{1}{\sqrt{b}}$

(vii) $8^{-\frac{2}{3}} = \frac{1}{8^{\frac{2}{3}}} = \frac{1}{\sqrt[3]{8^2}} = \frac{1}{4}$

Fractional Indices   Write these with roots and powers

Evaluate the following:

(a) $16^{\frac{3}{4}} = \sqrt[4]{16}^{\,3} = 2$

(b) $4^{\frac{1}{2}} = \sqrt{4} = 2$

(c) $36^{\frac{1}{2}} = \sqrt{36} = 6$

(d) $8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

(e) $9^{\frac{1}{2}} = \sqrt{9} = 3$

(f) $100^{\frac{3}{2}} = \sqrt{100^3} = 1000$

(g) $144^{\frac{5}{2}} = \sqrt{144}^{\,5}$
= 248832

(h) $81^{\frac{3}{4}} = \sqrt[4]{81}^{\,3}$
= 18.72 (2d.p.)

(i) $27^{\frac{1}{3}}$
= $\sqrt[3]{27} = 3$

(j) $49^{\frac{3}{2}}$
= $\sqrt{49}^{\,3}$
= 343

(i) $x^{\frac{1}{2}} = \sqrt{x}$

(ii) $a^{\frac{5}{2}} = \sqrt{a^5}$

(iii) $b^{\frac{7}{4}} = \sqrt[4]{b^7}$

(iv) $z^{-\frac{5}{2}} = \frac{1}{z^{\frac{5}{2}}} = \frac{1}{\sqrt{z^5}}$

(v) $q^{\frac{5}{3}} = \sqrt[3]{q^5}$

(vi) $6m^{\frac{2}{5}} = 6\sqrt[5]{m^2}$

(vii) $3t^{-\frac{1}{2}} = 3\frac{1}{t^{\frac{1}{2}}} = 3\frac{1}{\sqrt{t}}$

$\frac{3}{1} \times \frac{1}{\sqrt{t}}$ $\frac{3}{\sqrt{t}}$

Fractional Indices

Rewrite the following so that they have roots and powers

$8^{\frac{2}{3}}$ $\sqrt[3]{8^2}$

$k^{\frac{5}{7}} = \sqrt[7]{k^5}$

Fractional Indices

Rewrite the following so that they have a fractional index

① $\sqrt{x}$ $= x^{\frac{1}{2}}$

② $\sqrt[3]{y}$ $= y^{\frac{1}{3}}$

③ $\sqrt[4]{z}$ $= z^{\frac{1}{4}}$

④ $\left(\sqrt{x}\right)^3$ $= x^{\frac{3}{2}}$

⑤ $\left(\sqrt{x}\right)^4$ $= x^{\frac{4}{2}} = x^2$

⑥ $\dfrac{1}{\sqrt{x}}$ $= \dfrac{1}{x^{\frac{1}{2}}} = x^{-\frac{1}{2}}$

⑦ $\left(\sqrt[3]{y}\right)^7$ $= y^{\frac{7}{3}}$

⑧ $\left(\sqrt[4]{z}\right)^3$ $= z^{\frac{3}{4}}$

⑨ $\left(\sqrt[5]{w}\right)^3$ $= w^{\frac{3}{5}}$