Walking Talking - Surds and Indices

1.

Metric prefixes are used to describe large or small numbers.
The metric prefix 'milli', in millimetres or milligrams, is used to describe small numbers.
For example, 1 millimetre is 1000^{-1} metres which can also be written as 10^{-3} metres.

Complete the table below. [6]

Metric prefix	1000^x	10^y	Standard form
hecto	$1000^{\frac{2}{3}}$	.....	.....
tera	.....	10^{12}	.....
deci	$1000^{-\frac{1}{3}}$	.....	.....
yocto	.....	10^{-24}	.....

2. Raul has been asked to look at some data.
He is asked to write the data in the form 2^n, where n is a whole number or a decimal.
Write the following numbers in the form 2^n.

(a) $\dfrac{1}{2^3}$

.....

.....

[1]

(b) $(2^{0.3})^{0.4}$

.....

.....

[1]

(c) $\left(\sqrt[4]{8}\right)^{12}$

.....

.....

.....

.....

[2]

3.

(a) Simplify $4(x+5)-3(2x-4)$.

.....

.....

.....

.....

[2]

(b) Simplify $\dfrac{y^{16}\times y^2}{y^4}$.

.....

.....

.....

.....

[1]

(c) Solve $3b+2>29$.

.....

.....

.....

.....

[2]

4.

(a) Express $0\cdot4\dot{3}\dot{5}$ as a fraction.

.....

.....

.....

.....

.....

.....

.....

.....

[2]

(b) Express $100^{-\frac{1}{2}}$ as a fraction.

.....

.....

[1]

(c) Given that $f = \sqrt{2}$, $g = \sqrt{5}$ and $h = \sqrt{10}$, find, in its simplest form,

(i) $\frac{fg}{h}$,

.....

.....

.....

[1]

(ii) $fg + h$,

.....

.....

[1]

(iii) fh.

.....

.....

[1]

5.

(a) Evaluate $8^{-\frac{2}{3}}$. [2]

(b) Express $0{\cdot}00\dot{4}$ as a fraction. [2]

(c) Simplify $(4+\sqrt{3})^2$. [2]

6.

(a) Express $8^{-\frac{2}{3}}$ as a decimal.

.....

.....

.....

.....

[2]

(b) Factorise $4x^2 - 1600$.

.....

.....

[3]

(c) Evaluate $(\sqrt{3})^6$.

.....

[1]

(d) Simplify $(2 + 3\sqrt{2})(5 - \sqrt{2})$.

.....

.....

.....

.....

.....

[3]

7.

(a) Evaluate 19^0.

.....

[1]

(b) Find the value of $\left(\sqrt{80} - \sqrt{5}\right)^2$.

.....

.....

.....

.....

.....

[3]

(c) Express $0\dot{4}\dot{2}\dot{8}$ as a fraction.

.....

.....

.....

.....

.....

.....

.....

.....

[2]

(d) Simplify $(\pi + 3)(\pi - 3)$.
Give your answer in terms of π.

.....

.....

.....

.....

.....

[2]

8.

(a) Express $0\cdot0\dot{3}\dot{4}$ as a fraction.

[2]

(b) Simplify $(3\sqrt{5}-\sqrt{2})(3\sqrt{5}+\sqrt{2})$ and state whether your answer is rational or irrational.

[3]