

Laws of indices and surds

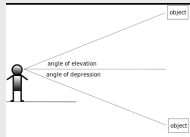
Law of Indices

- i) $a^m \times a^n = a^{m+n}$
- ii) $\frac{a^m}{a^n} = a^{m-n}$
- iii) $(a^m)^n = a^{m \times n}$
- iv) $(a \times b)^n = a^n \times b^n$
- v) $(\frac{a}{b})^n = \frac{a^n}{b^n}$
- vi) $a^0 = 1$

Law of Surds

- i) $\sqrt[n]{a} = a^{\frac{1}{n}}$
- ii) $\sqrt[n]{a \times b} = \sqrt[n]{a} \times \sqrt[n]{b}$
- iii) $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$
- iv) $(\sqrt[n]{a})^n = a$
- v) $\sqrt[n]{\sqrt[n]{a}} = \sqrt[n^2]{a}$
- vi) $(\sqrt[n]{a})^m = \sqrt[n]{a^m}$

Angles of elevation and depression



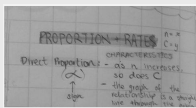
Probability

- Experimental probability = The frequency of the outcome / total number of trials
- Relative frequency = frequency of the outcome / total number of trials

Financial maths

- Dividing annual salary: Weekly = 52 | Fortnightly = 26 | Monthly = 12
- Calculating percentage of \$: $0.0\% \times \$$ | EG. 12% of 150 = 0.12×150

Proportional and rates



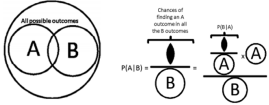
Extra probability

Probability

Joint Probability
The probability of events A and B occurring
 $P(A \text{ and } B) = P(A) \times P(B)$ where events A and B are independent

Union of Events
The probability of either event A or event B occurring
 $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Conditional Probability
The probability of event A occurring given that event B has occurred
 $\frac{P(A \text{ and } B)}{P(B)}$ or $\frac{P(B \text{ and } A)}{P(A)}$



Algebra

- Coefficient: The number in front | 5y, y's coefficient is 5
- Terms: A term is separated by a + or - sign | $5x-3y+2$ there are 3 terms there
- Constant: Constant is the single number which doesn't have any letters behind it

Factorising

Form	Factors
$a^2 - b^2$	$(a-b)(a+b)$
$a^2 + b^2$	PRIME
$a^2 - b^2$	$(a-b)(a^2 + ab + b^2)$
$a^2 + b^2$	$(a+b)(a^2 - ab + b^2)$

Linear and Non-linear graphs

- Gradient: Gradient = M | M=Rise divided by run
- Gradient through two points: $M = \frac{y_2 - y_1}{x_2 - x_1}$
- Gradient intercept method: $Y = mx + c$ | Find gradient + x and y intercept
- x and y intercept method: To solve X, $Y = 0$ | To solve Y, $X = 0$, Then plot the x and y intercepts
- Intercepts: $Y = C$ | $X = A$

Statistics

- Mean = $\frac{\text{sum of all values}}{\text{total number of values}}$
- Median = middle value (when the data are arranged in order)
- Mode = most common value

Measurement

- TSA: Area of all sides added up
- Volume: Area X Height
- SA of cylinder: $SA = 2\pi r^2 + 2\pi rh$

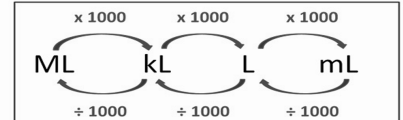
Measurement (cont)

- SA of sphere and volume: $A = 4\pi r^2$ | $V = \frac{4}{3}\pi r^3$ (volume)
- TSA of Cone: $\pi r l + \pi r^2$

Capacity

Converting CAPACITY Units

The Volume of Liquids and Solids is usually measured as a "Capacity".
In the Metric System, Capacity is based on the Litre or "L" unit.



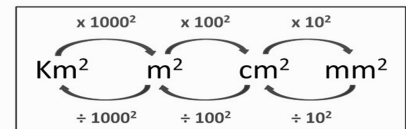
CAPACITY conversions use 1000's, and usually create fairly large results.

$32ML = ? L$ Need to x 1000 twice $32 \times 1000 \times 1000 = 32\,000\,000 L$ ✓

Area

Converting AREA Units

AREA consists of Square Units, so we need to SQUARE all our Lengths.



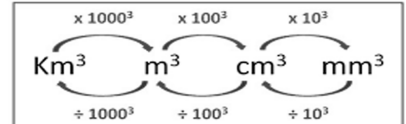
$5km^2 = ? m^2$ Need to x 1000² $5 \times 1000 \times 1000 = 5\,000\,000 m^2$ ✓
 $1200cm^2 = ? m^2$ Need to ÷ 100² $1200 \div 100 \div 100 = 0.12 m^2$ ✓

Volume

Converting VOLUME Units

VOLUME is how much 3D space is occupied, and is measured in cubes.

VOLUME consists of Cube Units, so we need to CUBE all our Lengths.

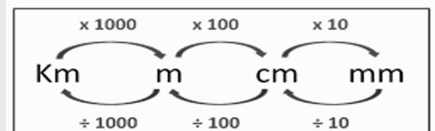


$3m^3 = ? cm^3$ Need to x 100³ $3 \times 100 \times 100 \times 100 = 3\,000\,000 cm^3$ ✓

Length

Converting LENGTH Units

It is easiest to use a conversion look-up diagram like the one below.



$5km = ? m$ Need to x 1000 $5 \times 1000 = 5000m$ ✓
 $120cm = ? m$ Need to ÷ 100 $120 \div 100 = 1.2m$ ✓

