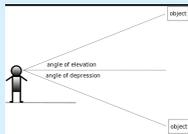


Laws of indices and surds

| Law of Indices | Law of Surds |
|--|--|
| i) $a^m \times a^n = a^{m+n}$ | i) $\sqrt[m]{a} = a^{1/m}$ |
| ii) $\frac{a^m}{a^n} = a^{m-n}$ | ii) $\sqrt[n]{a \times b} = \sqrt[n]{a} \times \sqrt[n]{b}$ |
| iii) $(a^m)^n = a^{m \times n}$ | iii) $\sqrt[m]{\frac{a}{b}} = \frac{\sqrt[m]{a}}{\sqrt[m]{b}}$ |
| iv) $(a \times b)^n = a^n \times b^n$ | iv) $(\sqrt[n]{a})^m = a^{m/n}$ |
| v) $(\frac{a}{b})^n = \frac{a^n}{b^n}$ | v) $\sqrt[m]{\sqrt[n]{a}} = \sqrt[m \times n]{a}$ |
| vi) $a^0 = 1$ | 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.% * \$ EG. 12% of 150 = 0.12 X 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 | 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 | $\pi rl + \pi r^2$ |

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.

VOLUME conversions use powers of 3, and usually create very large results.
 $3m^3 = ? cm^3$ 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 $120 \div 100 = 1.2m$ ✓