LCHL Formulae not in Tables:

Paper 1:

Arithmetic:

Percentages:

$$\%\ \text{Error} = \frac{Error}{Actual\ Value} \times 100\ \%$$

$$\%\ \text{Increase} = \frac{Increase}{Actual\ Value} \times 100\ \%$$

$$\%\ \text{Profit or Mark-Up} = \frac{Profit}{Cost\ Price} \times 100\ \%$$

$$\%\ \text{Profit Margin} = \frac{Profit}{Selling\ Price} \times 100\ \%$$

$$\%\ \text{Loss} = \frac{Loss}{Cost\ Price} \times 100\ \%$$

$$\%\ \text{Discount} = \frac{Discount}{Cost\ Price} \times 100\ \%$$

Complex Numbers:

Modulus:

If $z = a + bi$

$$|z| = \sqrt{a^2 + b^2}$$

Forming Quadratic from Roots:

$$z^2 - (Sum\ of\ Roots)z + (Product\ Roots) = 0$$

Sequences/Series:

$$\lim_{n\to\infty} \frac{1}{n^p} = 0$$

Differentiation:

Increasing/Decreasing/Turning Pts:

Increasing => $\frac{dy}{dx} > 0$

Decreasing => $\frac{dy}{dx} < 0$

Max/Min Points => $\frac{dy}{dx} = 0$

If $\frac{d^2y}{dx^2} < 0$, then it's a local maximum point.

If $\frac{d^2y}{dx^2} > 0$, then it's a local minimum point.

Point of Inflection:

$$\frac{d^2y}{dx^2} = 0$$

Algebra:

Factorising Cubes:

$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

Forming Quadratic from Roots:

$$x^2 - (sum\ of\ roots)x + (product\ of\ roots) = 0$$

Modulus Equations/Inequalities:

If $|x| = a$, then $x = a$ or $x = -a$.

If $|x| < a$, then $-a < x < a$.

If $|x| > a$, then $x < -a$ or $x > a$.

Functions:

Completed Square Form:

A function $ax^2 + bx + c$ is written in the form $a(x - h)^2 + k$.

Discriminants:

If $b^2 - 4ac \geq 0$ => 2 distinct real roots.

If $b^2 - 4ac = 0$ => 2 equal roots.

If $b^2 - 4ac < 0$ => no real roots.

Integration:

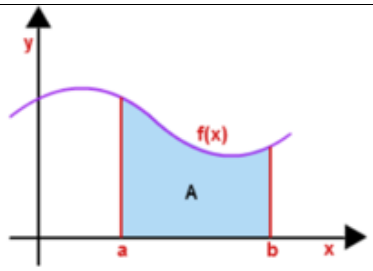
Trig Functions:

$$\int sin\ ax\ dx = -\frac{1}{a} cos\ ax + c$$

$$\int cos\ ax\ dx = \frac{1}{a} sin\ ax + c$$

Average Value:

$$Ave\ Value = \frac{1}{b-a}\int_a^b f(x)\,.\,dx$$



$$Area\ of\ Shaded = \int_a^b y\,.\,dx$$

Paper 2:

Statistics:

Standard Error of the Mean for 95% Confidence:

$$E = 1.96\frac{\sigma}{\sqrt{n}}$$

Standard Error of the Proportion for 95% Confidence:

$$E = 1.96\sqrt{\frac{p(1-p)}{n}}$$

Approximation of Error for calculating Sample Size only:

$$E \approx \frac{1}{\sqrt{n}}$$

Geometry:

Enlargements:

$$Area\ Image = k^2 \times Area\ of\ Object$$

The Line:

Slopes:

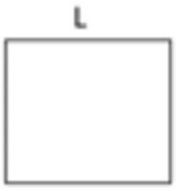
$$\text{Slope} = \frac{RISE}{RUN}$$

Perpendicular

$$m_1 \times m_2 = -1$$

Area & Volume:

Square:



Area = L^2 ✱

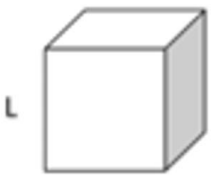
Per = 4L ✱

Rectangle:

Area = L x W ✱

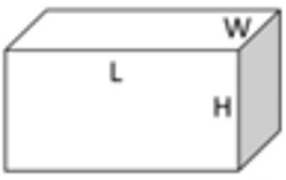
Per = 2L + 2W ✱

Cube / Cuboid:



Vol = L^3 ✱

TSA = $6L^2$ ✱



Vol = L x W x H ✱

TSA = 2LW + 2WH + 2HL ✱

Probability:

Mutually Exclusive Events:

If there is an overlap:

$$P(A\ OR\ B) = P(A) + P(B) - P(A\ AND\ B)$$

If there is no overlap:

$$P(A\ OR\ B) = P(A) + P(B)$$

Independent Events:

$$P(A \mid B) = P(A)$$

$$P(B \mid A) = P(B)$$

$$P(A \cap B) = P(A) \times P(B)$$

Conditional Probability:

$$P(A \mid B) = \frac{\#(A \cap B)}{\#(B)} = \frac{P(A \cap B)}{P(B)}$$

Trigonometry:

Cosine Rule for finding Angle:

$$cosA = \frac{b^2 + c^2 - a^2}{2bc}$$

Period of Trig Functions of form $\sin n\theta$ or $\cos n\theta$:

$$\text{Period} = \frac{360}{n}$$

The Circle:

Equation of Circle with Centre $(0,0)$:

$$\text{Equation: } x^2 + y^2 = r^2$$

Circle with X-Axis or Y-axis as Tangent:

$$g^2 = c$$

X-Axis

$$f^2 = c$$

Y-Axis