IGCSE Additional Mathematics 0606

Formulae List

1. Algebra

$a^m \times a^n = a^{m+n}$

$a^m \div a^n = a^{m-n}$

$(a^m)^n = a^{mn}$

$a^0 = 1$

$a^{-n} = \frac{1}{a^n}$

$a^2 - b^2 = (a - b)(a + b)$

$a^2 \pm 2ab + b^2 = (a \pm b)^2$

$\sqrt{(ab)} = \sqrt{a} \times \sqrt{b}$

$\frac{1}{\sqrt{a}} = \frac{\sqrt{a}}{a}$

2. Functions

$f \circ g(x) = f(g(x))$

If $y = f(x)$, then $f^{-1}(y) = x$

3. Quadratic Functions

$ax^2 + bx + c = 0$

$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Discriminant: $D = b^2 - 4ac$

$D > 0 \rightarrow$ Two real roots

$D = 0 \rightarrow$ One real root

$D < 0 \rightarrow$ No real roots

4. Simultaneous Equations

Solve linear-linear or linear-quadratic equations using substitution or elimination

5. Logarithmic and Exponential Functions

$\log(ab) = \log a + \log b$

$\log(\frac{a}{b}) = \log a - \log b$

$\log(a^n) = n \log a$

$\log a = b \Leftrightarrow a = 10^b$

$a^x = b \Leftrightarrow x = \log_a b$

6. Straight Line Graphs

$m = (y_2 - y_1) \div (x_2 - x_1)$

$y - y_1 = m(x - x_1)$

$y = mx + c$

7. Circular Measure

Arc Length: $s = r\theta$

Sector Area: $A = \frac{1}{2} r^2\theta$

8. Trigonometry

$\sin^2\theta + \cos^2\theta = 1$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$c^2 = a^2 + b^2 - 2ab\cos C$

Area $= \frac{1}{2} ab \sin C$

9. Calculus

$\frac{d}{dx}(x^n) = nx^{n-1}$

Stationary point: $\frac{dy}{dx} = 0$

$\int x^n \, dx = \frac{x^{n+1}}{n+1} + C$

$\int f'(x) \, dx = f(x) + C$

Area $= \int_a^b y \, dx$

10. Vectors

Magnitude of Vector: $|\vec{a}| = \sqrt{(x^2 + y^2)}$

Vector Notation: $\vec{a} + \vec{b}$,

Scalar multiplication: $k\vec{a}$

Position Vector: From origin to point A(x , y): $\overrightarrow{OA} = \begin{bmatrix} x \\ y \end{bmatrix}$

11. Matrices

Matrix multiplication: columns of A = rows of B

Inverse of 2×2 Matrix

For matrix A = $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

$A^{-1} = \frac{1}{\det(A)} . Adjoint\ (A)$

$A^{-1} = \frac{1}{ad - bc} \times \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$