Core 1 Revision

Algebra and Functions

- $a^m \times a^n = a^{m+n}$
- $a^{n/m} = \sqrt[m]{a^n}$
- $\left(a^m\right)^n = a^{mn}$
- $a^m \div a^n = a^{m-n}$
- $a^0 = 1$
- $a^{-m} = \dfrac{1}{a^m}$
- $x^2 - y^2 = (x+y)(x-y)$
- $\dfrac{1}{\sqrt{a}} = \dfrac{\sqrt{a}}{a}$

Quadratic Functions

- Solve by factorising, completing the square or by use of the quadratic formula.
- $x^2 + bx = \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2$
- $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Equations and Inequalities

- $\overbrace{-a \geq 4}^{\text{When dividing by negatives reverse the sign}}$

  $a \leq -4$
- Use a sketch to solve quadratic inequalities.

Curve Sketching

- $f(x+a) \rightarrow -a$ in the x axis
- $f(x) + a \rightarrow a$ in the y axis
- $f(ax) \rightarrow$ stretch $\frac{1}{a}$ in the x axis
- $f(x)a \rightarrow$ stretch a in the y axis
- $f(-x) \rightarrow$ flip in x axis
- $-f(x) \rightarrow$ flip in y axis

Co-ordinate Geometry

- $y = mx + c$

  $ax + by = 0$
- $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
- $m = \dfrac{y - y_1}{x - x_1}$
- Perpendicular Gradient $= -\dfrac{1}{m}$
- Sum of perpendicular gradients is -1

Sequences and Series

- Arithmetic/Recurrence relationships
- $U_{n+1} = U_n + k \qquad k \in \mathbb{Z}$
- $U_n = a + (n-1)d$
- $S_n = \sum_1^n = \dfrac{n}{2}[2a + (n-1)d] = \dfrac{n}{2}(a+L)$

Differentiation

- For a curve $f(x)$, $f'(x)$ is the gradient at a point.
- $f'(x) = \dfrac{dy}{dx}$
- $f(x) = ax^n$

  $f'(x) = nax^{n-1}$
- $f''(x) = \dfrac{dy^2}{dx^2}$

Integration

- $\int kx^n \, dx = k\dfrac{x^{n+1}}{n+1} + C$