Differentiation - Power rule:

 $\frac{d}{dx}x^n = n \cdot x^{n-1}$

Integration - Power rule:

$$\int x^n dx = \frac{1}{n+1} x^{n+1} + c \quad n \neq -1$$

The power'n' is decreased by one and brought down to multiply x.

Tips:

- 1. The constant of a function can be moved outside the integral Constant Multiple: $\int_{a}^{b} kf(x)dx = k \int_{a}^{b} f(x)dx \quad \text{Any number } k$ $\int_{a}^{b} -f(x)dx = -\int_{a}^{b} f(x)dx \quad k = -1$
- 2. Change roots/fractions to index power before integrating $3/x^3 = 3x^{-3}$
- 3. Simplify fractions by dividing numerator by denominator $(x^3 + x^2)/x = x^2 + x$
- 4. When there are brackets, you can expand! $x(2x-9) = 2x^2 - 9$

5.3 WORKED EXAMPLE	5.4 WORKED EXAMPLE
$\int \sqrt[3]{x} + 2dx$	$\int_{-3}^{-1} \frac{1 - x^3 - 4x^5}{2x^2} dx$