Find Integral:

$$\frac{x^{n+1}}{n+1}$$

Example: Find the indefinite Integral of:

$$\int 3x^2 = \frac{3x^3}{3} = \boxed{x^3 + C}$$

Steps:

$3x^2 \Rightarrow$ 1) Add 1 to the exponent:

$= 3x^3$

2) Divide the function by the new exponent:

$= \frac{3x^3}{3}$

3) Reduce if needed:

$\frac{3x^3}{3}$ ★ The top and bottom 3's divide to equal 1

Final Answer: $\boxed{x^3 + C}$ ★ Always add +C for indefinite integrals.

Find Definite Integral: $\int_a^b f(x)$

Intervals

$$\int_0^2 x^2 + 1$$

Steps:

1) Add 1 to the exponent:

$x^{2+1} + 1 \Rightarrow x^3 + x$

NOTE: whenever you have only a number and no x, you just add an x next to that number. For example: $5 = 5x$, $3 = 3x$, $1 = x$

2) Divide the term by the new exponent:

$$\frac{x^3}{3} + \frac{x^1}{1} \Rightarrow \boxed{\frac{x^3}{3} + x}$$

3) Plug in the intervals and solve:

$\boxed{F(b) - F(a)}$

$$\frac{x^3}{3} + x \Big|_0^2 \Rightarrow \left[\frac{(2)^3}{3} + 2\right] - \left[\frac{(0)^3}{3} + 0\right]$$

Note: ALWAYS plug in the value of b first, and then plug in a.

$$= \left[\frac{8}{3} + 2\right] - [0 + 0]$$

$$= \left[\frac{8}{3} + \frac{6}{3}\right] - [0] = \boxed{\frac{14}{3} u^2}$$

$\int_a^b = \Big|_a^b$

$0 = a$

$2 = b$