

## Precalc 15.4

$$FTC = F$$

Use the fundamental theorem of calculus  
to evaluate definite integrals

Find indefinite integrals  $+ C \quad \int L \, dx$

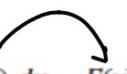
definite integral  $\int_3^5 (\quad) dx$

indefinite integral  $F \Big|_3^5$

**Fundamental  
Theorem of  
Calculus**

If  $F(x)$  is the antiderivative of the continuous function  $f(x)$ , then

$$\int_a^b f(x) \, dx = F(b) - F(a).$$

$$\int_a^b f(x) \, dx = F(x) \Big|_a^b = F(b) - F(a)$$


$$39. \int_{-2}^5 (x^2 - 3x + 8) dx$$

$$\begin{aligned} & \frac{x^3}{3} - 3 \cdot \frac{x^2}{2} + 8x \Big|_{-2}^5 \\ & \left( \frac{125}{3} - \frac{75}{2} + 40 \right) - \left( -\frac{8}{3} - \frac{12}{2} + -16 \right) \end{aligned}$$

=

How is this one different?

$$41. \int_2^3 (x - 1)^3 dx$$

$$\begin{aligned} & \int_2^3 [x^3 + 3x^2(-1) + 3x(-1)^2 - 1(-1)^3] \\ & \quad \left. \frac{x^4}{4} + \frac{3x^3}{3} + \frac{3x^2}{2} - 1x \right|_2^3 \end{aligned}$$

$$( ) - ( )$$

$$42. \int_0^1 \frac{x^2 - x - 2}{x - 2} dx$$

$$\cancel{x^2 - 2}$$

(Simplify: does it factor?)

$$\int_0^1 \frac{(x+1)(\cancel{x-2})}{\cancel{x-2}} dx$$

$$\int_0^1 x + 1 \left. \begin{array}{l} \\ \frac{x^2}{2} + x \end{array} \right|_0^1$$

$$( \quad ) - ( \quad )$$

