

Integration Review Day 1

- basic rule?
- rewrite?
 - division (long/synthetic)
 - trig identity
 - complete the square
- u-substitution

Examples Integrate.

$$\textcircled{1} \int \frac{\pi}{x} dx = \pi \cdot \int \frac{1}{x} dx = \pi \ln|x| + C$$

$$\textcircled{2} \int \frac{x^3 + x^2 - 2x}{\sqrt{x}} dx = \int (x^{5/2} + x^{3/2} - 2x^{1/2}) dx$$
$$= \frac{2}{7} x^{7/2} + \frac{2}{5} x^{5/2} - \frac{4}{3} x^{3/2} + C$$

$$\textcircled{3} \int 3^x dx = \frac{1}{\ln 3} \cdot 3^x + C$$

$$\textcircled{4} \int \tan^5 x \sec^2 x dx$$

$$u = \tan x$$

$$\frac{du}{dx} = \sec^2 x \quad du = \sec^2 x dx$$

$$\int u^5 du = \frac{1}{6} u^6 + C = \frac{1}{6} (\tan x)^6 + C = \frac{\tan^6 x}{6} + C$$

$$\textcircled{5} \int (\cos x + \csc^2 x) dx = \int \cos x dx + \int \csc^2 x dx$$
$$\sin x + \cot x + C$$