

Integration Review Day 1

$$\text{EX: } \int \frac{\pi}{x} dx \rightarrow \pi \int \frac{1}{x} dx = \pi \ln|x| + C$$

$$\begin{aligned} \text{EX: } \int \frac{x^3 + x^2 - 2x}{\sqrt{x}} dx &= \int (x^{\frac{3}{2}} + x^{\frac{5}{2}} - 2x^{\frac{1}{2}}) dx \\ &= \frac{2}{7} x^{\frac{7}{2}} + \frac{2}{5} x^{\frac{5}{2}} - \frac{4}{3} x^{\frac{3}{2}} + C \end{aligned}$$

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

$$\int (2 - x^{15}) dx \rightarrow 2x - \frac{1}{16} x^{16} + C$$

$$\int (x + x^{-1}) dx \rightarrow \int x dx + \int x^{-1} dx = \frac{1}{2} x^2 + \ln|x| + C$$

$$\int (6x^{\frac{3}{2}} + 5x^{-2}) dx = \frac{12}{5} x^{\frac{5}{2}} - \frac{5}{x} + C$$

$$\int (\sec x \tan x + \sec^2 x) dx \rightarrow \sec x + \tan x + C$$

$$\int \frac{e}{x^2} dx = -\frac{e}{x} + C$$

$$\int e^{\sqrt{x}} dx = x e^{\sqrt{x}} + C$$

$$\int 4x^{-5} dx = 4 \int x^{-5} dx = 10x^{-\frac{4}{5}} + C$$

$$\int \frac{x^{\frac{3}{2}}}{x^{\frac{1}{3}}} dx = \int x^{\frac{7}{6}} dx = \frac{6}{13} x^{\frac{13}{6}} + C$$

$$\int \frac{x^2 + 3x}{\sqrt{x}} dx = \frac{2}{5} x^{\frac{5}{2}} + 2x^{\frac{3}{2}} - 2x^{\frac{1}{2}} + C$$

$$\int \frac{x^3 - 1}{x - 1} dx = \int (x^2 + x + 1) dx = \frac{1}{3} x^3 + \frac{1}{2} x^2 + x + C$$

$$\int \frac{x \sin x + 1}{x} dx = -\cos x + \ln|x| + C$$

$$\int (5^x - 4^x) dx = \frac{5^x}{\ln 5} - \frac{4^x}{\ln 4} + C$$

$$\int \frac{\tan x}{\sin^2 x \sec x + \cos x} dx = -\cos x + C$$