

no u-substitution,
just simplify

Final Exam Review Problem 2

$$2) \int \cos x \tan x \, dx = \int \cos x \cdot \frac{\sin x}{\cos x} \, dx$$

$$\int \sin x \, dx$$

$$= -\cos x + C$$

$$3) \int \sin(x^3 - 2) x^2 \, dx$$

$$u = x^3 - 2$$

$$du = 3x^2 \, dx$$

$$\frac{1}{3} du = x^2 \, dx$$

$$\frac{1}{3} \int \sin u \, du \rightarrow \frac{1}{3} \int -\cos u = -\frac{1}{3} \cos(x^3 - 2) + C$$

$$4) \int_0^1 x \sqrt{x+1} \, dx$$

$$u = x+1 \quad x = u-1$$

$$du = dx$$

$$\int_1^2 (u-1) \sqrt{u} \, du = \int_1^2 u^{\frac{3}{2}} - u^{\frac{1}{2}} \, du$$

$$\left(\frac{2}{5} u^{\frac{5}{2}} - \frac{2}{3} u^{\frac{3}{2}} \right) \Big|_1^2 = \left[\left(\frac{2}{5} \right) 2^{\frac{5}{2}} - \left(\frac{2}{3} \right) 2^{\frac{3}{2}} \right] - \left[\left(\frac{2}{5} \right) 1^{\frac{5}{2}} - \left(\frac{2}{3} \right) 1^{\frac{3}{2}} \right]$$

$$\left[\left(\frac{2}{5} \right) 2^{\frac{5}{2}} - \left(\frac{2}{3} \right) 2^{\frac{3}{2}} \right] - \left[\frac{2}{5} - \frac{2}{3} \right]$$

$$= \left(\frac{2}{5} \right) 2^{\frac{5}{2}} - \left(\frac{2}{3} \right) 2^{\frac{3}{2}} + \frac{4}{15}$$