MAT 136 (Calculus I), 11-15 Quiz, Prof. Jim Swift

You can work in groups. Name: key

1. Evaluate $\frac{d}{dx}\sin(x^2+1)$ $= \cos(x^2+1)\cdot 2x$

2. Recall that $\int f(x)\,dx = F(x)+C$, where $F'(x) = f(x)$.

Fill in the blank. $\int e^{2x} + 2x e^{2x}\,dx = xe^{2x} + C$.

$F(x) = x e^{2x}$

$F'(x) = 1\cdot e^{2x} + x\cdot e^{2x}\cdot \frac{d}{dx}[2x] = e^{2x} + 2x e^{2x}$

this goes in the blank.

3. Evaluate $\int \cos(2x)\,dx$ $= \frac{1}{2}\sin(2x) + C$

Check: $\frac{d}{dx}\left[\frac{1}{2}\sin(2x)\right] = \frac{1}{2}\cos(2x)\cdot 2 = \cos(2x)$ ✓

It's OK to do this check in your ~~head~~ head. But always do it.

4. Evaluate $\int_0^1 \sqrt{x}\,dx$ $= \int_0^1 x^{\frac{1}{2}}\,dx = \left[\frac{x^{\frac{3}{2}}}{\frac{3}{2}}\right]_0^1 = \left[\frac{2}{3}x^{\frac{3}{2}}\right]_0^1$

$= \frac{2}{3}\cdot 1^{3/2} - \frac{2}{3}\cdot 0^{3/2} = \frac{2}{3}\cdot 1 - 0$

$= \boxed{\frac{2}{3}}$