IN CLASS QUIZ 3

NAME:_____

1. Compute $\int x^2 \sin(x)\, dx$

$u = x^2, \quad v' = \sin(x)$

$u' = 2x \quad v = -\cos(x)$

$\int x^2 \sin(x)\, dx = -x^2 \cos(x) + 2\int x \cos(x)\, dx$

Also for $\int x \cos(x)\, dx$

$u = x \quad v' = \cos(x)$

$u' = 1 \quad v = \sin(x)$

$\int x \cos(x)\, dx = x\sin(x) - \int \sin(x)\, dx = x\sin(x) + \cos(x) + C$

So

$\int x^2 \sin(x)\, dx = -x^2 \cos(x) + 2x\sin(x) + 2\cos(x) + C$

2. Use the reduction formula $\int \sin^n(x) = \frac{-1}{n}\sin^{n-1}(x)\cos(x) + \frac{n-1}{n}\int \sin^{n-2}(x)\, dx$ to calculate $\int \sin^3(x)\, dx$.

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

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

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