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Math 112
Quiz #11

Compute the following

4 1. $\int \frac{1}{x\ln(x)}$.

Let $u = \ln(x)$. Then $du = \frac{1}{x}dx$

$\Rightarrow \int \frac{1}{x\ln(x)}dx = \int \frac{1}{u}du = \ln|\ln(x)| + C$

4 2. $\int \frac{1}{x^2+x}dx$.

$\int \frac{1}{x^2+x}dx = \int \frac{1}{x(x+1)}dx = \int \left(\frac{A}{x} + \frac{B}{x+1}\right)dx$

$= \int \frac{A(x+1)+Bx}{x(x+1)}dx$

$B = -1$
$A = 1$

$= \int \left(\frac{1}{x} - \frac{1}{x+1}\right)dx = \ln|x| - \ln|x+1| + C$

4 3. $\int x^3\sin(x^2)dx$.

Let $u = x^2$, $du = 2x$

$\int x^3\sin(x^2)dx = \frac{1}{2}\int u\sin(u)du$.

$= -\frac{1}{2}u\cos(u) + \frac{1}{2}\int \cos(u)du$

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