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Calculus 1432
Quiz 4
February 7, 2014

1. (1 pt) $\frac{d}{dx}(\cosh x) =$ $\sinh x$

2. (1 pt) $\int \frac{1}{\sqrt{9-x^2}}\,dx =$ $\sin^{-1}\frac{x}{3} + C$

3. (2 pt) $\int 2xe^x\,dx$ $= 2xe^x - 2e^x + C$.

| u | dV | |
|---|---|---|
| $2x$ | $e^x$ | + |
| $2$ | $e^x$ | − |
| $0$ | $e^x$ | + |

4. (2 pt) $\int \arctan x\,dx =$ $x\tan^{-1}x - \int \frac{x}{1+x^2}\,dx = x\tan^{-1}x - \frac{1}{2}\ln(1+x^2) + C$

$u = \tan^{-1}x$ ← $dv = dx$

$du = \frac{dx}{1+x^2}$ ← $v = x$

5 (2 pt) $\int \frac{1-\ln x}{x}\,dx$ (Hint: split it up) $= \int \frac{dx}{x} - \int \frac{\ln x}{x}\,dx$

u-sub: let $u = \ln x$, $du = \frac{dx}{x}$ $\Rightarrow \int u\,du = \frac{u^2}{2} + C$

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

6. (2 pt) $\int_2^5 \frac{dx}{9+(x-2)^2} = \frac{1}{3}\tan^{-1}\left(\frac{x-2}{3}\right)\Big|_2^5 = \frac{1}{3}\left[\tan^{-1}1 - \tan^{-1}0\right]$

$5 \to 3$, $2 \to 0$, $\tan^{-1}1 = \frac{\pi}{4}$

$= \frac{1}{3}\cdot\frac{\pi}{4} = \frac{\pi}{12}$