Integrals and Natural Logarithms #3 - Answers

Spring 2013

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Instructions

Answers appear on the ANSWERS page. Solutions appear on the SOLUTIONS page.

1. $\int \left(7x^4 + x^3 + 5x + 10\right) dx = \frac{7}{5}x^5 + \frac{1}{4}x^4 + \frac{5}{2}x^2 + 10x + C$

2. $\int \left(8\sec(x)\tan(x) + 5\csc^2(x)\right) dx = 8\sec(x) - 5\cot(x) + C$

3. $\int_{x=-1}^{x=1} \left(x^3 + 9x^2 + 3\right) dx = 12$

4. $\int \sqrt{4x^3 + 6x}\left(6x^2 + 3\right) dx = \frac{1}{3}\left(4x^3 + 6x\right)^{\frac{3}{2}} + C$

5. $\int \sec\left(x^2\right)\tan\left(x^2\right)\, x\, dx = \frac{1}{2}\sec\left(x^2\right) + C$

6. $\int \frac{3x^2+x+2}{2x^3+x^2+4x} dx = \frac{1}{2}\ln\left|2x^3 + x^2 + 4x\right| + C$

7. $\frac{d}{dx}\left[\ln\left(\tan(x)\right)\right] = \frac{\sec^2(x)}{\tan(x)}$

8. $\frac{d}{dx}\left[\ln\left(8x^3 + 5x\right)\right] = \frac{24x^2+5}{8x^3+5x}$

9. $\frac{d}{dx}\left[\ln\left(x\sin(x)\right)\right] = \frac{1}{x} + \cot(x)$

   Alternativley:
   $\frac{d}{dx}\left[\ln\left(x\sin(x)\right)\right] = \frac{\sin x + x\cos x}{x\sin x}$

10. Compute: $\int_{x=0}^{x=1} \left(1 - x^2\right)^2\, x\, dx = \frac{1}{6}$