

Integrals and Natural Logarithms #1 - Answers

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Name _____

Instructions

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

1. $\int (5x^4 + 4x^3 + 6x + 6) dx = x^5 + x^4 + 3x^2 + 6x + C$

2. $\int (\sin(x) + \sec(x) \tan(x)) dx = -\cos(x) + \sec(x) + C$

3. $\int_{x=1}^{x=2} (6x^3 + 4x^2 + 4x) dx = \frac{227}{6}$

4. $\int (8x^3 + 12x^2)^{10} (x^2 + x) dx = \frac{1}{264} (8x^3 + 12x^2)^{11} + C$

5. $\int \sin(x^3 + 3x^2) (6x^2 + 12x) dx = -2 \cos(x^3 + 3x^2) + C$

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

7. $\frac{d}{dx} [\ln(\sin(x))] = \frac{\cos(x)}{\sin(x)} = \cot(x)$

8. $\frac{d}{dx} [\ln(3x^3 - 9x + 5)] = \frac{9x^2 - 9}{3x^3 - 9x + 5}$

9. $\frac{d}{dx} \left[\ln \left(\sqrt{\frac{x^2-1}{x}} \right) \right] = \frac{x}{x^2-1} - \frac{1}{2x}$

Alternativley:

$$\frac{d}{dx} \left[\ln \left(\sqrt{\frac{x^2-1}{x}} \right) \right] = \frac{1}{\left(\frac{x^2-1}{x}\right)^{\frac{1}{2}}} \cdot \frac{1}{2} \left(\frac{x^2-1}{x}\right)^{-\frac{1}{2}} \frac{2x(x)-(1)(x^2-1)}{x^2} = \frac{x^2+1}{2x(x^2-1)}$$

10. $\int_{x=-1}^{x=1} (x^2 - 3x + 1)^3 (8x - 12) dx = -624$