





1.  $\frac{1}{x^2} = x^{-2}$   
 $\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$

2.  $\frac{d}{dx} \ln(x^2) = \frac{1}{x^2} \cdot 2x = \frac{2}{x}$   
 $\frac{d}{dx} \ln(x^3) = \frac{1}{x^3} \cdot 3x^2 = \frac{3}{x}$   
 $\frac{d}{dx} \ln(x^4) = \frac{1}{x^4} \cdot 4x^3 = \frac{4}{x}$

3.  $\frac{d}{dx} \ln(x^2 + 1) = \frac{1}{x^2 + 1} \cdot 2x = \frac{2x}{x^2 + 1}$   
 $\frac{d}{dx} \ln(x^2 - 1) = \frac{1}{x^2 - 1} \cdot 2x = \frac{2x}{x^2 - 1}$   
 $\frac{d}{dx} \ln(x^2 + x) = \frac{1}{x^2 + x} \cdot (2x + 1) = \frac{2x + 1}{x^2 + x}$

4.  $\frac{d}{dx} \ln(x^2 + 2x + 1) = \frac{1}{x^2 + 2x + 1} \cdot (2x + 2) = \frac{2x + 2}{x^2 + 2x + 1}$   
 $\frac{d}{dx} \ln(x^2 - 2x + 1) = \frac{1}{x^2 - 2x + 1} \cdot (2x - 2) = \frac{2x - 2}{x^2 - 2x + 1}$   
 $\frac{d}{dx} \ln(x^2 + x + 1) = \frac{1}{x^2 + x + 1} \cdot (2x + 1) = \frac{2x + 1}{x^2 + x + 1}$

5.  $\frac{d}{dx} \ln(x^2 + 1) = \frac{2x}{x^2 + 1}$   
 $\frac{d}{dx} \ln(x^2 - 1) = \frac{2x}{x^2 - 1}$   
 $\frac{d}{dx} \ln(x^2 + x) = \frac{2x + 1}{x^2 + x}$

6.  $\frac{d}{dx} \ln(x^2 + 2x + 1) = \frac{2x + 2}{x^2 + 2x + 1}$   
 $\frac{d}{dx} \ln(x^2 - 2x + 1) = \frac{2x - 2}{x^2 - 2x + 1}$   
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