



Mathematik-Übungsblatt mit Lösungen von [www.worksheeps.de](http://www.worksheeps.de) / [www.mathe-aufgaben.net](http://www.mathe-aufgaben.net)  
Mathe-Aufgaben mit Lösungen einfach schnell selbst erstellen.

## Logarithmus-Funktionen

1)  $f(x) = \ln(5x^{45} + (-17))$

$$f'(x) = \frac{225x^{44}}{(5x^{45} + (-17))}$$
$$f''(x) = \frac{9900x^{43}}{(5x^{45} + (-17))} - \frac{50625x^{88}}{(5x^{45} + (-17))^2}$$

2)  $f(x) = \ln(13x^8 + 19)$

$$f'(x) = \frac{104x^7}{(13x^8 + 19)}$$
$$f''(x) = \frac{728x^6}{(13x^8 + 19)} - \frac{10816x^{14}}{(13x^8 + 19)^2}$$

3)  $f(x) = \ln(x^{18} - 8 \cdot x)$

$$f'(x) = (18x^{17} - 8) \cdot (x^{18} - 8x)^{-1}$$
$$f''(x) = 306x^{16} \cdot (x^{18} - 8x)^{-1} - (18x^{17} - 8)^2 \cdot (x^{18} - 8x)^{-2}$$

4)  $f(x) = \ln(x^{21} - (-13) \cdot x)$

$$f'(x) = (21x^{20} - (-13)) \cdot (x^{21} - (-13)x)^{-1}$$
$$f''(x) = 420x^{19} \cdot (x^{21} - (-13)x)^{-1} - (21x^{20} - (-13))^2 \cdot (x^{21} - (-13)x)^{-2}$$

5)  $f(x) = \ln(x^5 - (-12) \cdot x)$

$$f'(x) = (5x^4 - (-12)) \cdot (x^5 - (-12)x)^{-1}$$
$$f''(x) = 20x^3 \cdot (x^5 - (-12)x)^{-1} - (5x^4 - (-12))^2 \cdot (x^5 - (-12)x)^{-2}$$

6)  $f(x) = \ln(20x^{11} + 7)$

$$f'(x) = \frac{220x^{10}}{(20x^{11} + 7)}$$
$$f''(x) = \frac{2200x^9}{(20x^{11} + 7)} - \frac{48400x^{20}}{(20x^{11} + 7)^2}$$

7)  $f(x) = \ln((-8)x^{40} + 15)$

$$f'(x) = \frac{(-320)x^{39}}{((-8)x^{40} + 15)}$$
$$f''(x) = \frac{(-12480)x^{38}}{((-8)x^{40} + 15)} - \frac{102400x^{78}}{((-8)x^{40} + 15)^2}$$

8)  $f(x) = \ln((-12)x^5 + 13)$

$$f'(x) = \frac{(-60)x^4}{((-12)x^5 + 13)}$$
$$f''(x) = \frac{(-240)x^3}{((-12)x^5 + 13)} - \frac{3600x^8}{((-12)x^5 + 13)^2}$$

9)  $f(x) = \ln((-13)x^{42} + 7)$

$$f'(x) = \frac{(-546)x^{41}}{((-13)x^{42} + 7)}$$
$$f''(x) = \frac{(-22386)x^{40}}{((-13)x^{42} + 7)} - \frac{298116x^{82}}{((-13)x^{42} + 7)^2}$$

10)  $f(x) = \ln(18x^{46} + 1)$

$$f'(x) = \frac{828x^{45}}{(18x^{46} + 1)}$$
$$f''(x) = \frac{37260x^{44}}{(18x^{46} + 1)} - \frac{685584x^{90}}{(18x^{46} + 1)^2}$$