

Math 251

Worksheet 12
[Logarithmic and Exponential functions]

A. In each case determine y' .

1. $y = \ln \left(\frac{x^3}{1 + x^2} \right)$

2.

$$y = \ln (\ln (x \tan x)), \quad 0 < x < \frac{\pi}{2}$$

3. $y = \ln (\cos^2 x \sqrt{1 + x^4})$

4. $y = \log_2 (x^3 + x^2 + 1)$

5. $y = e^{(5x^2 + 3)}$

6. $y = e^{\sec^2 x}$

7. $y = \ln (\ln (\ln x))$

8. $y = (x^3 - 4x)^{\ln x}$

9. $y = x^{x^2}$

10. $y = x^{x \sin x}$

11. $y = e^{x^2} (x^2 + 1)^{10} \sqrt{x}$

12. $y = (\ln x)^{\sin x}$

13. $y = (x + \sqrt{x})^{-\frac{1}{3}}$

14. $y = 10^{\tan (\pi x)}$

15. $y = \ln |\sec x - \tan x|$

16. $y = e^{(\csc^2 x - \cot^2 x)}$

17. $y = x^2 \ln x$

18. $y = \frac{\sin^2 x \tan^4 x}{(x^3 + x^2 + 1)^3}$

19. $y = (\ln x)^{\cos x}$

20. $y = x^{\left(\frac{1}{x}\right)}$

21. $x = \ln \sec y$

22. $y = \ln \left(\frac{e^x + 1}{e^x - 1} \right)$

23. $y = \ln (x + \sqrt{x^2 + 1})$

24. $y = \ln (x + \sqrt{x^2 - 1})$