

Exponential and Natural Log Test Review

Name: _____

Solve the following equations:

1. $8^{r-1} = 16^{3r}$

2. $\log y + \log(y + 21) = 2$

3. $5^{y+2} = 15.3$

4. $3^{3x} = 2^{2x+3}$

5. $e^{3x-1} = 4$

6. $e^{6\ln x} = \ln e^{64}$

Find the derivatives of the following functions:

7. $y = \ln(x^5)$

8. $y = x^2 \ln(x+1)$

9. $y = \frac{\sin x}{\ln x}$

10. $y = \ln\left(\frac{x^2(\sqrt{x})}{x^3+5}\right)$

11. $y = e^{4x^3}$

12. $y = e^{\sqrt{x^2-2}}$

13. $y = e^{4\ln x}$

14. $y = 4^x$

15. $y = 7^{x^2-x}$

Find the integrals of the following functions:

16. $\int 8e^{x+1} dx$

17. $\int \frac{e^{\sqrt{r}}}{\sqrt{r}} dr$

18. $\int_{\ln 2}^{\ln 3} e^x dx$

19. $\int_0^{\ln 2} e^{3x} dx$

20. $\int 5^x dx$

21. $\int \frac{2y}{y^2 - 25} dy$

22. $\int_{-1}^0 \frac{3}{3x-2} dx$

23. $\int_1^2 \frac{2 \ln x}{x} dx$

Use logarithmic differentiation to find the derivatives of the following:

24. $y = \sqrt{\frac{t}{t+1}}$

25. $y = \frac{x\sqrt{x^2+1}}{(x+1)^{2/3}}$

KEY

1. $-1/3$

2. 4

3. -0.3051

4. 1.0890

5. 0.7954

6. 2

7. $\frac{5}{x}$

8. $2x \ln(x+1) + \frac{x^2}{x+1}$

9. $\frac{x \ln x \cos x - \sin x}{x \ln^2 x}$

10. $\frac{2}{x} + \frac{1}{2x} - \frac{3x^2}{x^3+5}$

11. $12x^2 e^{4x^3}$

12. $\frac{e^{\sqrt{x-2}}}{2\sqrt{x-2}}$

13. $4x^3$

14. $4^x \ln 4$

15. $7^{x^2-x} \ln 7(2x-1)$

16. $8e^{x+1} + c$

17. $2e^{\sqrt{r}} + c$

18. 1

19. $7/3$

20. $\frac{5^x}{\ln 5} + c$

21. $\ln|y^2 - 25| + c$

22. $-.9163$

23. $.4805$

24. $\sqrt{\frac{t}{t+1}} \left(\frac{1}{2t} - \frac{1}{2(t+1)} \right)$

25. $\frac{x\sqrt{x^2+1}}{(x+1)^{\frac{2}{3}}} \left(\frac{1}{x} + \frac{x}{x^2+1} - \frac{2}{3(x+1)} \right)$