

# WORKSHEET # 10

Row # \_\_\_\_\_

## Lesson # 68 Derivatives & Integrals of Logarithmic / Exp Func

Name \_\_\_\_\_

Period \_\_\_\_\_

Pg. 365

In Exercises 35–38, evaluate the definite integral.

36.  $\int_1^4 \frac{3}{1-2x} dx.$

37.  $\int_{-1}^0 \frac{x}{x^2+5} dx.$

38.  $\int_1^4 \frac{1}{\sqrt{x}(1+\sqrt{x})} dx.$

In Exercises 39–42, use the method shown in Example 2 to help perform the indicated differentiation.

39.  $\frac{d}{dx} \left[ \ln \frac{\cos x}{\sqrt{4-3x^2}} \right].$

40.  $\frac{d}{dx} \left[ \ln \sqrt{\frac{x-1}{x+1}} \right].$

41.  $\frac{d}{dx} [\ln (\sqrt{x} \sqrt[3]{x+3} \sqrt[5]{3x-2})].$

42.  $\frac{d}{dx} \left[ \ln \left( \frac{\sqrt{x} \sqrt[3]{x+1}}{\sin x \sec x} \right) \right].$

In Exercises 43–46, obtain  $dy/dx$  by logarithmic differentiation.

43.  $y = x \sqrt[3]{1+x^2}.$

44.  $y = \sqrt[5]{\frac{x-1}{x+1}}.$

45.  $y = \frac{(x^2-8)^{1/3} \sqrt{x^3+1}}{x^6-7x+5}.$

46.  $y = \frac{\sin x \cos x \tan^3 x}{\sqrt{x}}.$

47. Find

(a)  $\frac{d}{dx} [\log_x e]$

(b)  $\frac{d}{dx} [\log_x 2].$

In Exercises 51 and 52, use Formula (5) or (7) to find the limit.

51. Find  $\lim_{x \rightarrow 0} (1-2x)^{1/x}$ . [Hint: Let  $t = -2x$ .]

52. Find  $\lim_{x \rightarrow +\infty} (1+3/x)^x$ . [Hint: Let  $t = 3/x$ .]

# Worksheet #10 Answers

36.  $\frac{-3}{2} \ln 7$

37.  $\frac{1}{2} \ln\left(\frac{5}{6}\right)$

38.  $2 \ln\left(\frac{3}{2}\right)$

39.  $-\tan x + \frac{3x}{(4-3x^2)}$

41.  $\frac{1}{2x} + \frac{1}{3(x+3)} + \frac{3}{5(3x-2)}$

43.  $dy/dx = [1/x + 2x/(3(1+x^2))] [x(1+x^2)^{(1/3)}]$

44.  $\frac{dy}{dx} = \sqrt[5]{\frac{x-1}{x+1}} \left( \frac{1}{5(x-1)} - \frac{1}{5(x+1)} \right)$