

Review for 5.1-5.5 Test

Find the derivative of the function.

1.  $f(x) = \ln\left(\frac{x^3\sqrt{x-2}}{\sqrt{4x^5}}\right)$       2.  $f(x) = \ln(x + \sqrt{2x^2 - 1})$

Find the equation of the tangent line to the graph of  $f$  at the given point.

3.  $f(x) = 5x^4 - \ln x$      $(1, 5)$

Use logarithmic differentiation to find  $\frac{dy}{dx}$

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

Find the indefinite integral.

5.  $\int \frac{x}{5-3x^2} dx$       6.  $\int \frac{2x^5 + x^3 + 6}{3x} dx$

Find the indefinite integral by u-substitution. (Hint: Let  $u$  be the denominator of the integrand)

7.  $\int \frac{x^2}{\sqrt{3-x^3}} dx$

Find the definite integral.

8.  $\int_1^3 \frac{x+2}{x} dx$

Find the inverse of the function

9.  $y = \frac{x+7}{x-3}$

Find  $(f^{-1})'(a)$

10.  $f(x) = 3x^5 + 12x - 39$      $a = 81$

**Find the derivative**

11.  $f(x) = 3e^{5\sqrt{x}}$       12.  $y = \ln(3 + e^{8x})$

Find the integral or evaluate the definite integral.

13.  $\int \frac{e^x + 7}{e^x} dx$     14.  $\int \frac{6x^2 + 6}{(x^3 + 3x)^2} dx$     15.  $\int_1^{e+1} \frac{1}{3(x+1)} dx$     16.  $\int_0^2 \frac{dx}{5x+3}$

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FOR THE FOLLOWING YOU CAN USE [WWW.CALCCHAT.COM](http://WWW.CALCCHAT.COM) TO CHECK YOUR ODD ANSWERS

Solve the equation accurate to three decimal places.

21.  $3^{2x} = 75$       25.  $\left(1 + \frac{.09}{12}\right)^{12t} = 3$       29.  $\log_3 x^2 = 4.5$

Find the derivative of the function.

22.  $g(t) = 2^{6t}$       41.  $g(\alpha) = 2^{-\alpha} \cos \pi\alpha$       44.  $y = \log_3 \frac{x\sqrt{x-1}}{2}$

Find the equation of the tangent line to the graph of the function at the given point.

51.  $y = \log_3 x$      $(27,3)$       52.  $y = \log_{10} 2x$      $(5,1)$

Use logarithmic differentiation to find  $dy/dx$ .

53.  $y = x^{2/x}$

Find an equation of the tangent line to the graph of the function at the given point.

59.  $y = (\ln x)^{\cos x}$      $(e,1)$

Evaluate the integrals and definite integrals.

65.  $\int \frac{3^{2x}}{1+3^{2x}} dx$     66.  $\int 2^{\sin x} \cos x dx$     67.  $\int_{-1}^2 2^x dx$     70.  $\int_1^e (6^x - 2^x) dx$

72. Compound Interest

- How large a deposit, at 8% interest compounded continuously, must be made to obtain a balance of \$50000 in 12 years?
- A deposit earns interest at a rate of  $r$  percent compounded continuously and doubles in value in 6 years. Find  $r$ .

93. To estimate the amount of defoliation caused by the gypsy moth during a year, a forester counts the number of egg masses on  $\frac{1}{40}$  of an acre the preceding fall. The percent of defoliation  $y$  is approximated

by 
$$y = \frac{300}{3 + 17e^{-0.0625x}}$$

Where  $x$  is the number of egg masses in thousands.

- Estimate the percent of defoliation if 2000 egg masses are counted.
- Estimate the number of egg masses that existed if you observe that approximately  $\frac{2}{3}$  of a forest is defoliated.

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