MathPro Tutoring Practice Tests

This chapter test correlates with:

Calculus of a Single Variable, 8th ed.

by Larson, Hostetler, Edwards   or

Houghton Mifflin, 2006

Calculus with Analytic Geometry, 8th ed.

by Larson, Hostetler, Edwards

Houghton Mifflin, 2006

Chapter 5, Part 1: Sections 5.1-5.4

The Natural Logarithmic Function, Inverse Functions, and Exponential Functions

$$\begin{bmatrix} \text{Also:} \\ 7^{\text{th}} \text{ edition, Sections 5.1-5.4} \\ 6^{\text{th}} \text{ edition, Sections 5.1-5.4} \end{bmatrix}$$

A few notes:

- If you are using a different textbook, this may not be a comprehensive chapter test for you.
- Solutions are available at www.mathprotutoring.com/tests.
- Angle measures are represented using radian measure, unless there is a pressing reason to use degree measure. If degree measure is used, there will always be a ° symbol.
- This test is copyright material. You must obtain express written permission from Linda Sinclair (linda@mathprotutoring.com) in order to duplicate and/or share this test with others.
- Please check www.mathprotutoring.com/tests soon for new tests. New ones will be added just as quickly as they are created.

Calculus   Ch. 5 Part 1: Sections 5.1-5.4

1.   Write the expression as the natural log of a single quantity:
$\frac{1}{2}\ln 2 - \ln(x-3)$

2.   Expand the logarithmic expression using the properties of logarithms:
$\ln \sqrt[3]{ab^3}$

3.   Solve the equation: $\ln \sqrt{x-2} = 4$

4.   Find the limit: $\lim\limits_{x \to -4^+} \ln(x+4)$

Questions 5-9: Find the derivative.

5. $y = \ln \sqrt{x^2 + 1}$

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

7. $y = \ln\left(e^x - 1\right)$

8. $y = e^{4x} + \tan 4x$

9. $y = x\left(e^x + \ln x\right)$

Questions 10-16: Find the indefinite integral.

10. $\displaystyle \int \frac{x^2}{x^3 - 5} dx$

11. $\displaystyle \int \frac{3}{\sqrt[3]{2t}} dt$

12. $\displaystyle\int \frac{1}{x\ln x}\,dx$

13. $\displaystyle\int \frac{\sin x}{1-\cos x}\,dx$

14. $\displaystyle\int \frac{e^x - e^{-x}}{e^x + e^{-x}}\,dx$

15. $\displaystyle\int e^{3y}\,dy$

16. $\displaystyle\int x\tan(x^2)\,dx$

Questions 1-6: Evaluate the definite integral.

17. $\displaystyle\int_{3}^{5}\frac{x+1}{x-1}dx$

18. $\displaystyle\int_{1}^{4}\frac{e^{2/x}}{2x^2}dx$

19. Find an equation of the tangent line to the graph of $f(x) = x^2 \ln x + 2x$ at the point (1,2).

20. Determine whether $f(x) = x^3 + 5x + 3$ has an inverse function.

21.   If $f(x) = 5x^3 + 7x + 1$, find $\left(f^{-1} \right)'(-11)$.

22.   Find $\dfrac{dy}{dx}$ and evaluate it at $x = 0$: $e^{xy} - 2x + 1 = y$