Custom Calculus Test Solutions

Solution to Problem 1

Find the derivative of: e^{-x}

$$-e^{-x}$$

Solution to Problem 2

Find the derivative of: e^{-x}

$$-e^{-x}$$

Solution to Problem 3

Find the integral of: $\sqrt[3]{x}$

$$\frac{3x^{\frac{4}{3}}}{4} + C$$

Solution to Problem 4

Find the integral of: $\sin(x)$

$$-\cos(x) + C$$

Solution to Problem 5

Use U-substitution to find the integral of: $\sin(2x)$

$$-\frac{\cos(2x)}{2} + C$$

Solution to Problem 6

Use integration by parts to find the integral of: $x\log(x)$

$$\frac{x^2 \cdot (2\log(x) - 1)}{4} + C$$

Solution to Problem 7

Find the integral of the trigonometric function: $\sin(x)\cos(x)$

$$\frac{\sin^2(x)}{2} + C$$

Solution to Problem 8

Use trigonometric substitution to find the integral of: $\sqrt{1-x^2}$

$$\frac{x\sqrt{1-x^2}}{2} + \frac{\operatorname{asin}(x)}{2} + C$$

Solution to Problem 9

Use partial fractions to find the integral of: $\frac{1}{x^2+1}$

$$\operatorname{atan}(x) + C$$

Solution to Problem 10

Find the improper integral of: $\frac{1}{x^2+1}$ from 1 to ∞

$$\frac{\pi}{4}$$

Solution to Problem 11

Find the limit of: $\cot(x)$ as x approaches ∞

$$\cot(\infty)$$