Custom Calculus Test Solutions

Solution to Problem 1

Find the derivative of: $\frac{1}{x^2}$

$$-\frac{2}{x^3}$$

Solution to Problem 2

Find the derivative of: $\operatorname{acos}(x)$

$$-\frac{1}{\sqrt{1-x^2}}$$

Solution to Problem 3

Find the integral of: $\operatorname{asin}(x)$

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

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: e^{2x}

$$\frac{e^{2x}}{2} + C$$

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: $\cos^2(x)$

$$\frac{x}{2} + \frac{\sin(2x)}{4} + C$$

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: $\sqrt[3]{x}$ as x approaches ∞

$$\infty$$