

# Custom Calculus Test Problems

## Problem 1

Find the derivative of:  $\sin(\pi x)$

## Problem 2

Find the derivative of:  $\cot(x)$

### Problem 3

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

### Problem 4

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

### Problem 5

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

### Problem 6

Find the integral of:  $\frac{1}{x}$

## Problem 7

Use U-substitution to find the integral of:  $(2x + 1)^3$

## Problem 8

Use U-substitution to find the integral of:  $(2x + 1)^3$

## Problem 9

Use U-substitution to find the integral of:  $e^{2x}$

## Problem 10

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

## Problem 11

Use integration by parts to find the integral of:  $xe^x$

## Problem 12

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

### Problem 13

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

### Problem 14

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

### Problem 15

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

### Problem 16

Find the limit of:  $\frac{1}{x+1}$  as  $x$  approaches 1