

# GREAT CALCULUS MYSTERY

## Introduction

Find the general antiderivative for each of the following.

**Example:**  $f(x) = x^2 + \cos x$

1)  $f(x) = 10x$

2)  $f(x) = \frac{1}{x\sqrt{x}}$

3)  $f(x) = (3x^2 - 1)^2$

4)  $f(x) = \sin x + \cos x$

## By the River

For each integrand given below, identify  $u$  and  $du$ .

**Example:**  $\int 4 \tan^3 x \sec^2 x \, dx$

5)  $\int 4x^3(x^4 + 8)^5 \, dx$

6)  $\int 2 \cos(2x) \sin^3(2x) \, dx$

7)  $\int \left(\frac{1}{x} + 3\right)^4 \left(\frac{-1}{x^2}\right) \, dx$

8)  $\int \frac{\sin \sqrt{2x+1}}{\sqrt{2x+1}} \, dx$

## Instigator in Our Midst

Rewrite each integral given below using  $u$ -substitution.

**Example:**  $\int \sin x (3 + \cos x)^4 \, dx$

9)  $\int x^2 \cos x^3 \, dx$

10)  $\int 5x \cdot \sqrt[3]{1-x^2} \, dx$

11)  $\int \sec^2(x - \pi) \, dx$

12)  $\int \frac{x^2 \sin(x^3 + 1)}{\cos^2(x^3 + 1)} \, dx$

## False Accusations

Evaluate each indefinite integral.

**Example:**  $\int \frac{\sin(4x)}{\cos^3(4x)} \, dx$

13)  $\int \frac{1}{\sqrt{2x}} \, dx$

14)  $\int (3 \sin x - \cos 2x) \, dx$

15)  $\int \left(6x + \frac{x}{\sqrt{9-x^2}}\right) \, dx$

16)  $\int \frac{(3x^2 + 1)^2}{\sqrt{x}} \, dx$