

## Problem Set

### Section: 5.3

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#### Problem 1

If  $y = \int_{\sqrt[3]{x}}^0 \sin(t^3) dt$ . Find  $\frac{dy}{dx}$ .

**Problem 2**

Evaluate the integral

$$\int_0^4 2^x dx$$

**Problem 3**

Let  $\int_0^{x^2} \frac{2f(\sqrt{t})}{t^2} dt = x^2 - 1$ . If  $x > 0$ , find  $f'(2)$

**Problem 4**

If  $G(u) = \int_1^u g(x)dx$  where  $g(x) = \int_1^{x^2} \frac{\sqrt{9+t^2}}{t} dt$ . Find  $G''(2)$ .

**Problem (Challenge)**

Show that

$$0 \leq \int_5^{10} \frac{x}{x^4 + x^2 + 1} \leq 0.6$$

(Hint: compare the integrand to a simpler function.)