

**Math 148 Start-of-Semester Review**

1. Find the derivative of each of the following.

(a)  $g(x) = \frac{4x}{e^x + 3}$

(b)  $h(x) = 7 \cdot 3^{x^2 - 4x}$

(c)  $f(x) = (4x - 3)^7 \ln(2x - 7)$

(d)  $j(x) = \log_8 \left( \frac{3x}{x-9} \right)$  (Hint: Use properties of logarithms to simplify first.)

(e)  $m(x) = \sin(\tan x)$

2. Compute each of the following integrals.

(a)  $\int (7 - 3x^{-5} + 2x^{-1}) dx$

(b)  $\int \left( 5\sqrt{x} - \sqrt{11} + \frac{4}{\sqrt[5]{x}} \right) dx$

(c)  $\int 7x^6 \sqrt{5+x^7} dx$

(d)  $\int (x^9 + 4x)e^{x^{10} + 20x^2} dx$

(e)  $\int 4 \sec^2(7x) dx$

(f)  $\int \frac{6m}{\sqrt[3]{m-3}} dm$

(g)  $\int \frac{4}{p \ln p} dp$

(h)  $\int \sin x \cos^5 x dx$

3. Find  $f(x)$  if  $f'(x) = 9x + 5x^{-2} - 7$  and  $f(3) = 10$ .

4. Compute each of the following.

(a)  $\int_{-2}^3 (7x - 8e^x) dx$

(b)  $\int_1^4 \frac{x}{(x^2 + 9)^5} dx$

(c)  $\int_1^a 5t(8t^4 - 7t^{-3}) dt$

(d)  $\int_{-1}^2 (x-5)(x^2-10x)^3 dx$