

Math 116 Homework 1- Due Tuesday 9/22

Directions: Except where indicated, merely finding the answer to a problem is not enough to receive credit. You must show how you arrived at that answer. DO NOT convert roots or transcendentals like e into a decimal approximation; just leave them as they are.

1) Verify that f has an inverse function through differentiation, then find $(f^{-1})'(c)$ for the given value of c .

a) $f(x) = x + 2\sqrt{x}$, $x > 0$, $c = 8$

b) $f(x) = \int_1^{\frac{x}{3}} \sqrt{10 + t^2} dt$, $c = 0$

2) Find the derivatives of the functions.

a) $\ln(xe^x)$

b) $f(x) = e^{4\ln x}$

c) $f(x) = 11^{-4x}$

3) Compute the value of the integrals.

a) $\int \frac{5^{2\sqrt{x}}}{\sqrt{x}} dx$

b) $\int_0^1 \frac{e^x}{6 - e^x} dx$

c) $\int_{-1}^2 6x^2 7^{x^3} dx$

d) $\int \frac{-\ln(x^2)}{x^3} dx$

e) $\int_{\pi/6}^{\pi/4} \frac{\cos(x)}{1 + \sin(x)} dx$

4) Let R be the region bounded by the graph of $y = e^{-x^2}$, the x -axis, and the lines $x = 0$ and $x = 1$.

a) Find the volume of the solid generated by revolving R about the y -axis.

b) Set up an integral for the volume of the solid obtained by revolving R about the x -axis; do not attempt to compute the volume!

5) Use logarithmic differentiation to find the derivatives of the given functions.

a) $y = \frac{(x^3 + 1)^4}{\cos^2(x) \sin(3x)}$

b) $y = x^{2x^2}$