

LABS 4, Math 249, March 9, 2005

The local linear approximation of $f(x) = \sqrt{9+x^2}$ at values of x close to 0 is given by

2 For the function $y = 6\sqrt[3]{x}$, if x changes from 1000 to 1001 then the approximate change in y is

(A) $dy = 2x^{-2/3}$ (B) $dy = 6(\sqrt[3]{1001} - 10)$ (C) $dy = -0.01861$

(D) $dy = 4y$ (E) $dy = \frac{1}{50}$

3 Let $f(x) = \frac{3}{x^2}$, $x < 0$.

(a) Find $f^{-1}(x)$

(b) Find the domain of $f^{-1}(x)$

4 Find x if $\ln\left(\frac{5}{x}\right) + \ln(2x^3) = \ln(40)$

5 Let $f(x) = x^4 + x^3 + 1$ for $0 \leq x \leq 2$

(a) Show that f^{-1} exists (b) Find $f^{-1}(3)$

6 Let $f(x) = x^3 + 3x + 1$. Find $\frac{d}{dx}(f^{-1}(x))$

7 If $y = \ln|\sec x|$ then $\frac{dy}{dx} =$ _____

8 If $y = 2^{\sin x}$ then $\frac{dy}{dx} =$ _____

9 Find x if $\ln\left(\frac{5}{x}\right) + \ln(2x^3) = \ln(40)$