Math 31B: Week 2 Section

TA: Ben Szczesny Last updated: 2018/01/16

Information

My office hours are now: 2pm on Tue and 4pm on Thur.

Discussion Questions

Question 1. Solve the following equations:

(a) $7^{\log_7(21x)} = 3$

(b) $\ln(x^2+4) = 2\ln(x) + \ln(2)$

(c) $7e^{5t} = 100$

(d) $\log_3(y) + 3\log(y^2) = 14$

Question 2. find a domain on which f is one-to-one and a formula for the inverse of f restricted to this domain. Sketch the graphs of f and f^{-1}.

(a) $f(x) = \frac{1}{x+1}$

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

Question 3. We have from lectures that if g is the inverse for a differentiable and one-to-one function f, then for x with $x \neq 0$,

$$g'(x) = \frac{1}{f'(g(x))}.$$

(a) Let $f(x) = x^3 + 1$ and g it's inverse. Find a formula for $g(x)$ and calculate g' in two ways. The first by differentiating g, and the second way by applying the above theorem.

(b) Let $f(x) = x^3 + 2x + 4$ and g it's inverse. Without finding a formula for $g(x)$ (no seriously, don't even try) calculate $g(7)$ and then $g'(7)$.

Question 4. Calculate the following derivatives

(a) $y = \ln(x^2 6^x)$

(b) $y = \ln\left(\frac{x+1}{x^3+1}\right)$

(c) $y = 8^{\cos(x)}$

(d) $y = x^{e^x}$

Homework Questions

Section 7.2

16, 18, 20, 22, 26, 32, 36

Section 7.3

30, 34, 38, 46, 48, 76, 80

Extra Questions

Question 5. Differentiate the following:

(a) $y = \frac{x(x^2+1)}{\sqrt{x+1}}$

(b) $y = x^{3^x}$

(c) $y = \pi^{5x-2}$

(d) $y = (2x+1)(4x^2)\sqrt{x-9}$

*** Question 6.** Prove the formula $\log_a(b)\log_b(a) = 1$ for all positive numbers a, b with $a \neq 1$ and $b \neq 1$.

*** Question 7.** Let f be a differentiable function with inverse g such that $f(x) = f'(x)$. Show that $g'(x) = x^{-1}$.