Time OK

$\bar{x} = 18.0/30$ Attended 27 in

$m = 17$ First left at 18, 19, 19, 20, 21, 21

bunch @ 23-24

med = 24

MATH 131
Quiz VI
November 15, 1993

Name

7 1. A bacteria culture of count 1000 grows to 2500 in 2 hours. The rate of growth is proportional to the count, so $y = 1000e^{kt}$ describes the count y after t hours. 10

a. Show that $k = (1/2)\ln(2.5)$.

b. When will the culture reach 4000?

a.

$2500 = 1000 e^{2k}$

$2.5 = e^{2k}$

$2k = \ln 2.5$

$k = \frac{1}{2}\ln(2.5)$

Some put in, got 2500

b. $y = 1000 e^{(\frac{1}{2}\ln 2.5)t} = 4000$

$4 = e^{\frac{1}{2}\ln 2.5 t}$

$\ln 4 = \frac{1}{2}\ln 2.5\, t$

$t = \frac{2\ln 4}{\ln 2.5} \approx 3.026$

8 2. Compute the following derivatives: 6

many forgot chain rule

a. $\ln(x^2 + 3)$ $\qquad \frac{1}{x^2+3}\,2x$

b. $\sqrt{3e^x + 2}$ $\qquad \frac{1}{2}(3e^x+2)^{-1/2}(3e^x)$

15 3. Compute the following integrals:

a. $\displaystyle\int \frac{x^3}{\sqrt{x^4+3}}\,dx = \int \frac{1}{4} u^{-1/2}\,du = \frac{1}{4}\frac{u^{1/2}}{1/2} + c = \frac{1}{2}\sqrt{x^4+3} + c$ 8

$u = x^4 + 3$

$du = 4x^3\,dx$

$\frac{1}{4}du = x^3\,dx$

b. $\displaystyle\int \tan x\,(\sec x)^2\,dx$ $\qquad \displaystyle\int u\,du = \frac{u^2}{2} + c = \frac{\tan^2}{2} + c$ 9

$u = \tan x$

$du = \sec^2 x\,dx$

did this in class before Q

c. $\displaystyle\int_1^2 \frac{x}{x+2}\,dx = \int_3^4 \frac{u-2}{u}\,du = \int_3^4 1 - \frac{2}{u}\,du = u - 2\ln u \Big|_3^4$ 4

$u = x+2$

$du = dx$

$x = u - 2$

$x = 1,\ u = 3$

$x = 2\ u = 4$

$= 4 - 2\ln 4 - (3 - 2\ln 3)$

$= 1 - 2\ln 4 + 2\ln 3$

$.4246$