Time OK
(20 min)

MATH 131
Quiz VIII
December 2, 1988

Name KEY

mean 13.3
median 15.5

1. Find the following:

$\frac{d}{dx} e^{x^2+1} = e^{x^2+1}\, 2x$

2/3

$f(x) = \sqrt{e^x + x}$, $f'(x) = \frac{1}{2}(e^x+x)^{-1/2}(e^x+1)$

$= (e^x+x)^{1/2} \qquad = \frac{e^x+1}{2\sqrt{e^x+x}}$

1/2

$\int_0^1 e^{3x}\,dx = \left.\frac{e^{3x}}{3}\right|_0^1 = \frac{e^3}{3} - \frac{e^0}{3} = \frac{e^3-1}{3}$

lots of small errors

2/3 or $u = 3x$, $du = 3dx$, $\frac{1}{3}du = dx$

$= \frac{1}{3}\int_0^3 e^u\,du = \frac{1}{3} e^u\Big|_0^3 = \frac{e^3}{3} - \frac{e^0}{3} = \frac{e^3-1}{3}$

2. Simplify:

$\ln\sqrt{e^{x/2}} = \ln(e^{x/2})^{1/2} = \frac{1}{2}\ln e^{x/2} = \frac{1}{2}\cdot\frac{x}{2} = \frac{x}{4}$

5 1/2

3. Complete: $y = e^x$ if and only if $x = \ln y$

3 3+ 3

4. A company knows it can sell 400 television sets a week at a price of \$150. It also knows that for every dollar it raises the price, it will sell 2 fewer sets in a week. What price will maximize the total revenue for a week?

1/3

$R = p\cdot q$ $\qquad p=0 \quad R=0$

$= p(400 - 2(p-150))$ $\qquad p=350 \quad R=0$

$= p(400 - 2p + 300)$

$= p(700-2p) \qquad 0 \le p \le 350$

$= 700p - 2p^2$

$R' = 700 - 4p = 0$

$p = \frac{700}{4} = \boxed{175}$