Math 0120
Final Examination
05-1
(Answers)

1(a) $f'(x) = \frac{1}{2\sqrt{x}} - \frac{1}{2}x^{-\frac{3}{2}}$ 1(b) $u'(x) = \frac{(x^2+1)(1)-(x)(2x)}{(x^2+1)^2})$ 1(c) $y' = 2te^{2t} + e^{2t}$

1(d) $g'(y) = \frac{5y^4}{y^5}$ 1(e) $h'(y) = 5(\ln y)^4 \frac{1}{y}$

2(a) Revenue would decrease, since the instantaneous rate of change at x =100 is negative.
(b) Revenue would decrease by about $4.

3(a) D(p) = $-\frac{p}{10} + 60$. 3(b) $300 4. y = $-\frac{2}{13}X + \frac{28}{13}$ 5(a) $1000 e 5(b) bout 32 years

6(a) 1 6(b) $\frac{x^2}{2}$ +ln|x| $+C$ 6(c) $\frac{1}{2}(e^4 - 1)$ 6(d) $\frac{x^2}{2}\ln x - \frac{1}{4}x^2 + C$ 6(e) $\frac{(\ln x)^2}{2} + C$

7(b) A = $\frac{1}{6}$ square units

8. About 5.493 million video games

9(a) The minimum value is 0. x^2 and y^4 are both greater than or equal to zero, so their sum will be greater than or equal to zero. 9(b) There are no local extrema. There is a saddle point at (0,0).

10. f_{max} = f(-1,2) = 3