Math 211 Sample Quiz # 4 Fall 2011

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SECTION  PROBLEMS (odd)
2.5 1-39, 45-51
3.1 11-35
3.2 11-23, 39-47
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1. Find the derivative $\frac{dy}{dx}$, by implicit differentiation, for the given curve:
   (a) $x^3 + x^2y + 4y^2 = 6$
   (b) $x^2y + xy^2 = 3x$
   (c) $\sqrt{xy} = 1 + x^2y$
   (d) $4\cos x \sin y = 1$
   (e) $\cos(x - y) = y \sin x$

2. Find the derivative $\frac{dy}{dx}$ for the given curve at the indicated point:
   (a) $y^2 = x^3(2 - x)$; (1,1)
   (b) $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 4$; $(-3\sqrt{3},1)$

3. Find an equation for the tangent line to the given function at the indicated point:
   (a) $\sqrt{x} + \sqrt{y} = 3$; (4,1)
   (b) $y = \tan x$; $(\frac{\pi}{3}, \sqrt{3})$
   (c) $y = x\sqrt{1 + x^2}$; $(1,\sqrt{2})$
   (d) $y = \sin(\sin x)$; $(\pi, 0)$
   (e) $y = \tan(\frac{\pi x^2}{4})$; (1,1)

4. Find $\frac{d^2y}{dx^2}$, by implicit differentiation, at the indicated point:
   (a) $x^3 + y^3 = 16$; (2,2)
   (b) $xy + y^2 = 1$; (0,-1)

5. Find the absolute maximum and absolute minimum values of the given functions on the given interval.
   (a) $f(x) = 3x^2 - 12x + 5$ and $[0, 3]$ (b) $f(x) = x^3 - 3x + 1$ and $[0, 3]$ (c) $f(x) = 2x^3 + 3x^2 + 4$ and $[-2, 1]$ (c) $f(x) = 18x + 15x^2 - 4x^3$ and $[-3, 4]$ (d) $f(x) = x^4 - 4x^2 + 2$ and $[-3, 2]$ (f) $f(x) = 3x^5 - 5x^3 - 1$ and $[-2, 2]$ (h) $f(x) = x + \cos x$ and $[0, 2\pi]$ (i) $f(x) = 2x - 3x^{\frac{2}{3}}$ on $[-1, 3]$.

6. Find all numbers c that satisfy the conclusion of Rolle's Theorem for the given functions on the given intervals.
   (a) $f(x) = x^2 - 4x + 1$ and $[0, 4]$ (b) $f(x) = x^3 - 3x^2 + 2x + 5$ and $[0, 2]$ (c) $f(x) = 9x^2 - x^4$ and $[-3, 3]$

7. Find all numbers c that satisfy the conclusion of the Mean Value Theorem for the given functions on the given intervals.
   (a) $f(x) = 3x^2 + 2x + 5$ and $[-1, 1]$
   (b) $f(x) = x^3 + x - 1$ and $[0, 1]$
   (c) $f(x) = 3x^2 + 6x - 5$ and $[-2, 1]$