MA 141 TEST # 3 Name: _____
November 3, 2000 SS #: _____
Show All Work Row #: _____

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1. (10 pts) Find the equation of the tangent line to the curve $x^2 + xy + 2y^2 = 28$ at the point $(2, 3)$.

2. (5 pts) Find dy/dx of the curve $\sqrt{x+y} + \sqrt{x-y} = 6$ using implicit differentiation.

3. (5 pts each) Find the derivative of the following functions:

   (a) $f(t) = \ln(\cos t)$.

   (b) $g(t) = \arctan(3t - 4)$.

   (c) $y = (t^2 + 3)e^t$.

   (d) $f(x) = (x^2 - \sqrt{x})3^x$.

   (e) $h(p) = \frac{1+p^2}{3+2p^2}$.

   (f) $f(x) = x^{\pi^2} + (\pi^2)^x$.

   (g) $w = \sqrt{(x^2 5^x)^3}$.

   (h) $f(\theta) = \frac{1}{1+e^{-\theta}}$.

   (i) $h(\omega) = \omega \arcsin \omega$.

   (j) $y = \text{arcsec}(x)$.

4. (5 pts each) Let $f(x) = x^4 - x^2 + 2$.

   (a) Find the interval on which f is increasing or decreasing.

   (b) Find the intervals on which the graph of f is concave upward or downward.

   (c) Sketch the graph of f.