MATH 112 – EXAM II Hints and Answers
Version Alpha
Spring 2009

1. (4 points each)

   (a) ANSWER: $f'(t) = t^5 \cdot 3(2t+1)^2 \cdot 2 + (2t+1)^3 \cdot 5t^4$

   (b) ANSWER: $\dfrac{dv}{du} = \dfrac{e^{(3u^2+u)} \cdot \left(\frac{2u-4}{u^2-4u}\right) - \ln(u^2-4u) \cdot e^{(3u^2+u)} \cdot (6u+1)}{\left[e^{(3u^2+u)}\right]^2}$

   (c) ANSWER: $h_m(m,p) = 9e^{(mp+m^2p^2)} \cdot (p + 2mp^2)$

   (d) ANSWER: $\dfrac{\partial w}{\partial y} = 2x^3y - \dfrac{1}{xy} \cdot x - 5(y^2+1)^{-6}(2y)$

2. HINTS: The constraints are $2x + 3y \leq 45$ and $x + y \leq 21$. The objective function is the profit: $P(x,y) = 2.50x + 3.00y$. The vertices of the feasible region are $(0,0)$, $(0,15)$, $(21,0)$, and $(18,3)$.

   ANSWER: $x = 18$, $y = 3$

3. (a) (8 points) ANSWERS:

   - $D(x) = 5x^3 - 21x^2 + 24x + 9$
   - $D'(x) = 15x^2 - 42x + 24$
   - $D''(x) = 30x - 42$
   - $T(x) = 20x^3 - 63x^2 + 48x + 9$
   - $T'(x) = 60x^2 - 126x + 48$
   - $T''(x) = 120x - 126$

   (b) HINT: Set $D'(x) = 0$ and solve for x.
   ANSWER: $x = 0.8$ and 2

   (c) ANSWER: $D''(0.8) < 0$, which implies that $x = 0.8$ gives a local max. $D''(2) > 0$, which implies that $x = 2$ gives a local min.

   (d) ANSWER: $T''(x)$ is linear and has a positive slope. This means that it has no critical points and its smallest and largest values must occur at the endpoints of the interval: largest $= T''(5) = 474$, smallest $= T''(2) = 114$.