MATH 112 — WINTER 2011

Exam II Version Alpha — Hints and Answers

1. (4 points each)

   (a) ANSWER: $\dfrac{dy}{dx} = x \cdot e^{x^3} \cdot 3x^2 + e^{x^3} + \dfrac{20x^4}{2+4x^5}$

   (b) ANSWER: $g'(t) = \dfrac{\sqrt{2t+9} \cdot e^{3t-4} \cdot 3 - e^{3t-4} \cdot \frac{1}{2}(2t+9)^{-1/2} \cdot 2}{(\sqrt{2t+9})^2}$

   (c) ANSWER: $Q_s(r,s) = \left(\dfrac{9s}{r}\right)^3 \cdot 4\,[r\ln(s)]^3 \cdot \dfrac{r}{s} + [r\ln(s)]^4 \cdot 3\left(\dfrac{9s}{r}\right)^2\left(\dfrac{9}{r}\right)$

2. ANSWER: $(x, y) = (0.2, 25)$

3. HINTS: You need to maximize the objective function

$$S(x, y) = 12x + 10y,$$

   subject to the constraints

$$30x + 24y \leq 1098 \text{ and } y \leq 22.$$

   The vertices of your feasible region are $(0,0), (0,22), (19,22), (36.6,0)$.

   ANSWER: $x = 19$, $y = 22$, for a maximum of 448 servings

4. (a) (3 points) ANSWER: from $q = 0$ to $q = 49.775$ thousand Gizmos

   (b) (5 points) ANSWER: concave up

   (c) (5 points) ANSWER: $q = 120.25$ thousand Gizmos

   (d) (6 points) ANSWER: $q = 1.16$ gives a local min; $q = 25.84$ gives a local max