TTU - MATH1331 (Business Calculus) - JOSH ENGWER - 10/22/2011

PRACTICE EXAM 2 - SOLUTIONS (Sections 10.1,10.2,10.4,10.5 & Regression)

* For most problems, only the answer and maybe a hint is given – you have to fill in the details!

* Exception to the above : Problem 1 is solved merely by visual inspection of the given graph

1. a) h increases over interval $\boxed{(a,b)\cup(d,e)\cup(p,r)}$ b) h decreases over $\boxed{(b,d)\cup(e,p)\cup(r,s)}$
   c) Relative minima : $\boxed{x\in\{d,p\}}$ Relative maxima : $\boxed{x\in\{b,e,r\}}$
   d) h is concave up over $\boxed{(c,e)\cup(e,q)}$ e) h is concave down over $\boxed{(a,c)\cup(q,s)}$
   f) Inflection points : $\boxed{x\in\{c,q\}}$
   g) Absolute minimum occurs at $\boxed{x=s}$ h) Absolute maximum occurs at $\boxed{x=e}$

2. a) Acceptable answers: $(-\infty,0)\cup(0,\infty)$ or $(-\infty,\infty)$ or $\mathbb{R}$ or "All real numbers"
   b) Acceptable answers: $\emptyset$ or "Nowhere" or "No real numbers" c) None
   d) $(-\infty,0)$ e) $(0,\infty)$ f) $x=0$

3. a) Acceptable answers: $(-\infty,1)\cup(1,\infty)$ or $\mathbb{R}\setminus\{1\}$ or "All real numbers except 1"
   b) Acceptable answers: $\emptyset$ or "Nowhere" or "No real numbers" c) None
   d) $(1,\infty)$ e) $(-\infty,1)$ f) Acceptable answers: $x=1$ or the point $(1,3)$
   g) Absolute minimum occurs at $x=-3$ with absolute minimum value of $g(-3)=-125$
   Absolute maximum occurs at $x=3$ with absolute maximum value of $g(3)=19$

4. a) $P'(x)=-2x+8$ b) The monthly advertising budget should be 4000 dollars per month.

5. Length = 12.5 ft and Width = 10 ft, which implies the maximum area of the garden is 125 ft^2.

6. L = 6.846 ft and W = 8.680 ft, which implies the least amount of fencing used is 58.433 ft
   [all values rounded to 3 decimal places]

7. $y=0.9303x+0.4549$ with $R^2=0.5617$

BONUS QUESTIONS:

(B1) $y=-0.3483x^3+2.3977x^2-3.7119x+2.6141$ with $R^2=0.6370$
(B2) $y=0.7714(1.5468^x)$ with $R^2=0.4614$
(B3) Cubic model is the best-fit because its R^2-value is the closest to 1.
(B4) ??? (come by my office hours and tell me what your answer is)