Answer Key

Math 1281
Fall 2001 Final Exam

Multiple Choice Problems

1. B
2. C
3. D

Written Answer Problems

4. a) $-\infty$ b) 0 c) 2 d) 2/3

5. $-3/x^2$; see solution set for derivation

6. a) intervals of increase: (-3 , -2), (0 , 2) ; interval of decrease: (-2 , 0)
   b) intervals of upward concavity: (-1 , 1), (1 , 2) ;
   interval of downward concavity: (-3 , -1)
   c) no vertical asymptotes (function is defined everywhere on the interval)
   d) see graph on other side
   e) see proof in solution set

7. a) fixed points: $x = 0 , 12/5$ b) $x = 0$ is a repellor; $x = 12/5$ is an attractor
   c) $x_1 = 35/32 \approx 1.094$; $x_2 = 16{,}275/8192 \approx 1.9867$ d) see graph below

8. a) Mean Value Theorem b) Intermediate Value Theorem c) see solution set

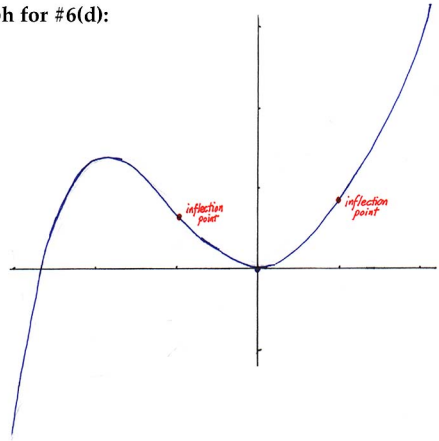
9. a) $f(x) \approx (\pi + 1) - x$ b) $\pi - 2$

10. the height of the cylinder must be decreasing

11. a) maximum value for perimeter: $2\sqrt{5}$ (for $x = \sqrt{(16/5)}$)
    b) minimum value for perimeter: 2 (for $x = 0$)

12. a) $\sqrt{[\, 2/(e^x - x)\,]}$
    b) $[\, 2 \cdot (\cos 2x) \cdot \exp(\sin^2 2x)\,] - \exp(x^2)$

graph for #6(d):



graph for #7(d):