ANSWERS to Exam 3 B

1. $\frac{1}{2}$
2. inelastic
3. (a) ∞ (b) ∞ (c) -8 (d) $-\frac{8}{5}$
4. $x = \frac{1}{2}$
5. minimum at $\left(-5, \frac{1}{5}\right)$
6. $\frac{dV}{dr} = 3\left(\frac{4\pi}{5}\right)r^2 + 4^{2r^4+1}(\ln 4)(8r^3)$
7. (a) 3
   (b) x= -6, -4, -1, 3, 5, 7
   (c) x= -1, 5, 7
   (d) smallest: $f'(6)$, $f'(0)$, $f'(4)$, $f'(-2)$, $f'(-7)$ largest
8. concave up: $(-\infty, -2.309) \cup (2.309, \infty)$
   concave down: $(-2.309, 2.309)$
9. 1. Does the $\lim_{x\to a} f(x)$ exist?
   2. Is $f(a)$ defined?
   3. Does $\lim_{x\to a} f(x) = f(a)$?
10. y=-.38x+2.24
11. (a) $y' = \frac{1}{3}\left(2x^4(4x - \ln(5x))\right)^{-\frac{2}{3}}\left[2x^4(4 - \frac{1}{5x}(5)) + (4x - \ln(5x))(8x^3)\right]$

    (b) $f'(x) = 2^{3x}(\ln 2)(3) - \frac{1}{\ln(x^2 - 5x + \pi^3)} \cdot \frac{1}{x^2 - 5x + \pi^3} \cdot (2x - 5)$

    (c) $g'(x) = \frac{(4x^2 + e^{5x^3-x^9})(5(6x)^4(6)) - (6x)^5(8x + e^{5x^3-x^9}(15x^2 - 9x^8))}{(4x^2 + e^{5x^3-x^9})^2}$

    (d) $y' = \frac{1}{2}(x^{\frac{1}{2}} + 1)^{-\frac{1}{2}}\left(\frac{1}{2}x^{-\frac{1}{2}}\right) - 4x^{-5}$

    (e) (see graph)