Calculus I Fall 2009 **Test 2 (Practice Version)**

Your Name: **Instructor: Steven Clontz**

Circle the letter for your final answer. Show your work. Calculators are not allowed.

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1. (Worth double.) A 15-foot ladder is leaning against a house. The base of the ladder is being pulled away at a constant rate of 2 feet/sec. How fast is the top of the ladder falling down the wall when the top of the ladder is 12 feet above the ground?

a) $\underline{\frac{3}{2} \text{ feet/sec}}$ b) $\frac{2}{3}$ feet/sec c) $\frac{3}{4}$ feet/sec d) $\frac{4}{3}$ feet/sec e) $\frac{1}{4}$ feet/sec

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2. (Worth double.) Find the volume of the largest cone that can be fit inside a sphere whose radius is 3 inches. (HINT: $V = \frac{1}{3}\pi r^2 h$)

a) $\frac{27\pi}{4}$ in^3 b) $\frac{32\pi}{3}$ in^3 c) $\frac{25\pi}{3}$ in^3 d) 0 in^3 e) $\frac{24\pi}{5}$ in^3

3. Evaluate $\lim_{x \to 0} \dfrac{\sin(x^2)}{x}$.

a) -1 b) 1 c) 2 d) $\dfrac{1}{2}$ e) $\underline{0}$

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4. (Worth double.) Evaluate $\lim_{t \to e^+} (\ln x)^{\frac{1}{x-e}}$.

a) $\underline{e^{1/e}}$ b) e c) e^{-1} d) $\dfrac{1}{e^e}$ e) $\ln(e)$

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5. Find the absolute maximum of $g(x) = \cos(x + \frac{\pi}{3})$ on $[0, \pi]$.

a) 1 b) $\underline{\frac{1}{2}}$ c) 0 d) $-\frac{1}{2}$ e) $\frac{\sqrt{3}}{2}$

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6. Find the absolute minimum of $g(x) = \cos(x + \frac{\pi}{3})$ on $[0, \pi]$.

a) $\underline{-1}$ b) $\frac{1}{2}$ c) 0 d) $-\frac{1}{2}$ e) $\frac{\sqrt{3}}{2}$

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7. Which of the following is an antiderivative of $4x^3 - \cos(x)$?

a) $\underline{x^4 - \sin(x) - \pi}$ b) $12x^2 + \sin(x)$

c) $x^4 + \sin(x)$ d) $4x^4 - \cos(\frac{1}{2}x^2) + 1$ e) $12x^2 - \cos(1)$

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8. Which of the following is an antiderivative of $2e^x - 7$?

a) $\underline{2e^x - 7x}$ b) $2e^x - 7$

c) $2xe^x$ d) $2e^{x+1} - 7x + e$ e) $7e^x - 2$

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9. On what part of its domain is $f(x) = x^3 + 6x^2 - 15x + 1$ increasing?

a) $x < 1$ b) $-5 < x < 1$

c) $-2 < x < 1$ d) $\underline{x < -5 \text{ or } x > 1}$ e) $x < 1$ or $x > -2$

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10. On what part of its domain is $f(x) = x^3 + 6x^2 - 15x + 1$ concave down?

a) $x < 1$ b) $-5 < x < 1$

c) $-2 < x < 1$ d) $\underline{x < -2}$ e) $x < 1$ or $x > -2$

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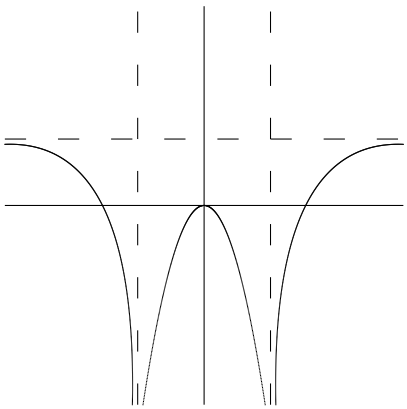
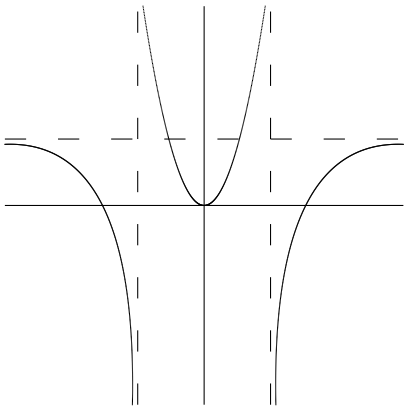
11. (Worth double.) Sketch the graph of $f(x) = x^3 + 6x^2 - 15x + 1$. (No multiple choice.)

12. Which of the following graphs most closely has the following properties?

- Increasing $-1 < x < 0,\ 0 < x < 1,\ x > 1$ Decreasing $x < -1$.
- Concave down $x < -1,\ -1 < x < 0,\ x > 1,$ Concave up $0 < x < 1$.
- Vertical Asymptotes $x = -1,\ x = 1$. Horizontal Asymptote $y = 1$.
- $f(0) = 0$.



a)



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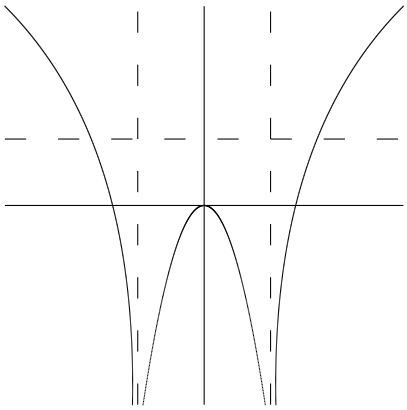

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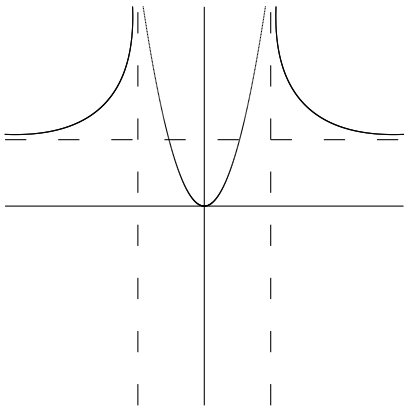

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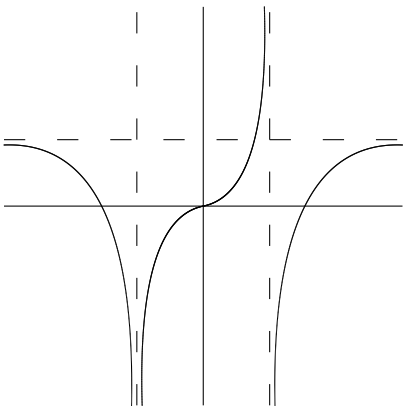

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