Midterm Exam III

Fall 2013, MAT 175 Section C401[19514]

December 3rd, 2013. 11:00AM–12:40PM.

Instructions: Print your name on the exam booklet. This exam is closed-book and closed-note. You cannot use any electronic device in this exam. You are not allowed to talk to other students. Write all details explicitly. Answers without justifications and/or calculation steps may receive no score.

1.(Sample Final I-13) Find the absolute maximum and minimum *values* of $f(x) = 2x^3 - 4x^2$ on the closed interval $[-1, 2]$.(10 Points)

2.(Sample Final I-13) Find the absolute maximum and minimum *values* of $f(x) = x^3 - x^2$ on the closed interval $[0, 1]$.(10 Points)

3.(Sample Final I-14) Find all relative extrema of $F(x) = x^4 + 5x^2 + 6$.(10 Points)

4.(Sample Final I-14) Find all relative extrema of $F(x) = x^3 - x^2$.(10 Points)

5.(Sample Final I-14) Find all relative extrema of $F(x) = 2x + \frac{2}{x}$.(10 Points)

6.(Sample Final I-11) Find where the graph of $y = -x^3 + x^2 + 2x - 1$ is concave up and concave down, and find all inflection points.(10 Points)

7.(Sample Final I-11) Find where the graph of $y = x^3 - x^2$ is concave up and concave down, and find all inflection points.(10 Points)

8.(Sample Final I-11) Find concavity and inflection points of the graph of $y = x^4 - 4x^3$.(10 Points)

9.(Sample Final II-9) Find the limit:(5 Points)

$$\lim_{x\to\infty} \frac{x^3 + 2x + 1}{x^2 + x + 1}.$$

10.(Sample Final II-9) Find the limit:(5 Points)

$$\lim_{x\to\infty} \frac{2x^2 + x + 2}{3x^2 - x + 1}.$$

11.(Sample Final I-7) Find the limit:(5 Points)

$$\lim_{t\to\infty} \frac{\cos t}{1 - e^t}.$$

12.(Sample Final II-9) Find the limit:(5 Points)

$$\lim_{x\to\infty} \frac{\sqrt{x}+2}{x+1}.$$