Math 231E, 2013. Midterm 3.

- This exam has 27 questions.
- You must not communicate with other students during this test. No books, notes, calculators, or electronic devices allowed.
- Please fill out all of the information below. Make sure to fill out your Scantron form as directed in class; fill in name, UIN number, and NetID.

1. Fill in your information:

Full Name: _____

UIN (Student Number): _____

NetID: _____

2. Fill out name, student number (UIN) and NetID on Scantron sheet. Then fill in the following answers on the Scantron form:

89. D
90. A
91. A
92. A
93. A
94. B
95. A
96. C

1. (4 points) Evaluate $\lim_{x \to \infty} \frac{\sin(2x)}{x}$.

(A) 0

(B) 3

(C) $+\infty$

(D) does not exist

(E) 2

2. (4 points) Let $\{a_n\}_{n=1}^{\infty}$ denote the sequence $a_n = \frac{1}{n^3}$ and S denote the series $S = \sum_{n=1}^{\infty} \frac{1}{n^3}$. Which of the following statements is true?

(A) the sequence diverges and the series converges.

(B) The sequence and the series both diverge.

(C) None of the other statements are true.

(D) The sequence converges and the series diverges.

(E) The sequence and the series both converge.

3. (4 points) Give the correct form for the partial fractions expansion of the function

$$\frac{x^3+2x^2-2x+3}{x(x-1)^2(x^2+3x+12)}$$

(A) $\dfrac{A}{x}+\dfrac{B}{x-1}+\dfrac{C}{(x-1)^2}+\dfrac{D}{x^2+3x+12}$

(B) $\dfrac{A}{x}+\dfrac{B}{x-1}+\dfrac{C}{(x-1)^2}+\dfrac{Dx+E}{x^2+3x+12}$

(C) $\dfrac{A}{x-1}+\dfrac{B}{x}+\dfrac{C}{x^2}+\dfrac{Dx+E}{x^2+3x+12}$

(D) $\dfrac{A}{x}+\dfrac{B}{x-1}+\dfrac{C}{(x-1)^2}+\dfrac{D}{x+3}+\dfrac{E}{x+4}$

(E) $\dfrac{A}{x}+\dfrac{B}{(x-1)^2}+\dfrac{C}{x^2+x+1}+\dfrac{D}{(x^2+3x+12)^2}$