Math 10C
Midterm Exam 1
April 19, 2011
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Version A

Instructions

1. **No calculators or other electronic devices are allowed during this exam.**
2. **You may use one page of notes, but no books or other assistance during this exam.**
3. **Write your *Name*, *PID*, and *Section* on the front of your Blue Book.**
4. **Write the *Version* of your exam at the top of the page on the front of your Blue Book.**
5. **Write your solutions clearly in your Blue Book**
   (a) **Carefully indicate the number and letter of each question and question part.**
   (b) **Present your answers in the same order they appear in the exam.**
   (c) **Start each question on a new side of a page.**
6. **Read each question carefully, and answer each question completely.**
7. **Show all of your work; no credit will be given for unsupported answers.**

0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (9 points) Let t be the time, in hours, it takes for a student to complete a final exam. All students complete the exam within two [one] hours and the density function for t is given by

$$p(t) = \begin{cases} \frac{1}{b}\left(4t - t^3\right) & \text{if } 0 < t < 2 \\ 0 & \text{otherwise} \end{cases}$$

   (a) Find the value of b.
   (b) What is the mean time for students to complete the final exam? Express your answer (i) symbolically in terms of b and (ii) numerically, using the value of b you found in part (a).
   (c) Determine the cumulative distribution function $P(t)$. Express your answer (i) symbolically in terms of b and (ii) numerically, using the value of b you found in part (a).

2. (6 points)
   (a) Find the 2^{nd} degree Taylor polynomial for $f(x) = e^{-x}$ at $a = 0$.
   (b) Use this polynomial to approximate $e^{-0.01}$ to five decimal places.

3. (6 points)
   (a) Use the fact that $0.575757\ldots = 0.57 + 0.0057 + 0.000057 + \cdots$ to write $0.575757\ldots$ as a geometric series.
   (b) Use the formula for the sum of a geometric series to write $0.575757\ldots$ as a rational number.

Note: Problem 4 is on the other side of this page.

4. (6 points) Write in your Blue Book the letter of each equation lettered **(a)**–**(f)** below. Next to each letter, write the number of the corresponding graph from among the graphs numbered **(1)**–**(9)** below. You need not provide any explanation; however, you must clearly list your choices. Note: Yes, there are more graphs than equations.

(a) $z = -\frac{1}{x^2+y^2}$

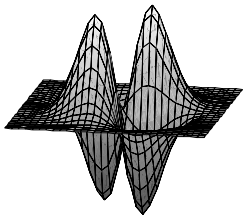
(b) $z = \sin(y)$

(c) $z = \cos^2(x)\,\cos^2(y)$

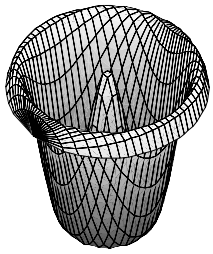
(d) $z = \frac{\sin\left(x^2+y^2\right)}{x^2+y^2}$

(e) $z = |x|\,|y|$

(f) $z = x\,y\,e^{-\left(x^2+y^2\right)}$



(1)



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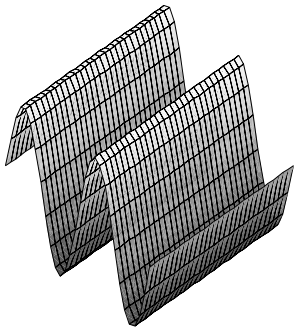

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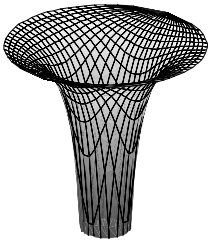

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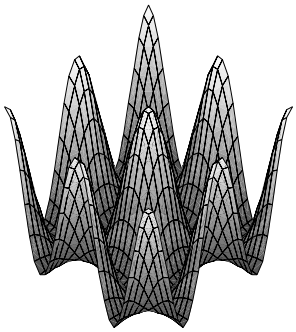

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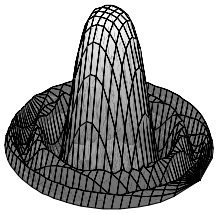

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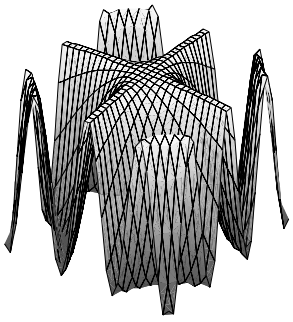

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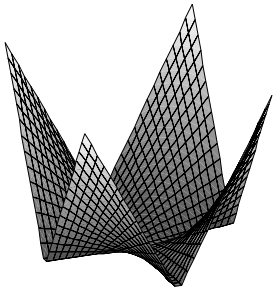

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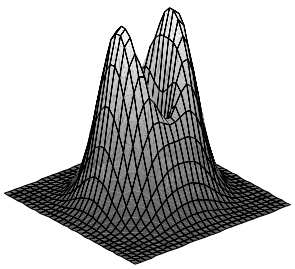

(9)