MAT1505-05 22F Test 2 Print Name (Last, First) ________________ , ______________|____

Show all work, including mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation, IDENTIFYING expressions by their proper symbols (introducing them if necessary), and use EQUAL SIGNS and arrows when appropriate. Always SIMPLIFY expressions. BOX final short answers. LABEL parts of problem. Keep answers EXACT (but give decimal approximations for interpretation when appropriate). Indicate where technology is used and what type (Maple, GC). Only use technology to CHECK hand calculations, not substitute for them.

pledge

When you have completed the exam, please read and sign the dr bob integrity pledge and hand this test sheet in on top of your answer sheets as a cover page, with the first test page facing up:
"During this examination, all work has been my own. I give my word that I have not resorted to any ethically questionable means of improving my grade or anyone else's on this examination and that I have not discussed this exam with anyone other than my instructor, nor will I until after the exam period is terminated for all participants."

Signature: Date:

1. a) Let $f(x) = x\sin(\pi x)$ on $0 \le x \le 1$. Evaluate the area under its graph on this interval and use it to convert *f* into a probability distribution function $p(x)$ over that interval. Use Maple for the antiderivatives you need in this problem.
b) Evaluate the probability that the variable x takes a value greater than 0.5. (State the exact and approximate value to 3 decimal places.)
c) Evaluate the mean value μ of the variable x . (State the exact and approximate value to 3 decimal places.)
d) Find numerically to 3 decimal places the location *xmax* of the peak value of this distribution function (using calculus!).
e) Make a rough sketch ot the function over this interval with verticals from the graph down to the values of *xmas*, μ on the axis.

2. Consider the improper integral $\displaystyle\int_1^\infty \frac{\ln(x)}{x^{\frac{3}{2}}}\,dx$. Using Maple's antiderivative, evaluate the limit which shows that this integral has a finite value. Explain how you evaluate your limit (l'Hopital's rule!) and give its exact and approximate value to 4 decimal places. (Does your result agree with Maple's direct evaluation of this integral?)

3. Find the arclength of the tip of the parabola $y = 1 - x^2$ above the horizontal axis. Use Maple for the antiderivative you need. Give the exact and 4 decimal place answer.

solution