**MATH 162 Practice QUIZ V**

1. For each improper integral (of the second kind) below, determine convergence or divergence. For those that converge, compute its value.









2. For which value(s) of the constant *C* will the following improper integral converge?



1. Find the *volume* of the solid of revolution obtained by rotating the curve

y = 1/x2 from x = 1 to x = ∞ about the x-axis or explain why no such number exists.

4. For each of the following improper integrals, determine convergence or divergence. Use an appropriate version of the Comparison Test.

(a) 

(b) 

(c) 

(d) 

(e) 

(f) 

(g) 

5. For each of the following sequences, determine *convergence* or *divergence*. In the case of convergence, find the *limit* of the sequence. *Briefly explain your reasoning!*

(a) 

(b) 

(c) 

(d) 

(e) 

6. Consider the following *recursively defined* sequence:

a1 = 4

a2 = 2

an = an-1an-2 – an-1 – an-2 + 1 for n ≥ 3.

Find the numerical values of a3, a4, a5 and a6. (Show your work.)

7. To which of the following series does the “*nth term test for divergence*” apply? Explain!













*8.* For n ≥ 1, let



Determine convergence or divergence of the sequence {an}. (*Hint:* Do *not* try to evaluate the integral! Calculator solutions are not accepted.)

*Hint*: Is the sequence *monotone*?

*9.* Let an = 1/1 + ½ + 1/3 + ¼ + … +1/n for n ≥ 1(integers only)

Demonstrate that the sequence {an} diverges.

10. Assuming that the limit exists, find it.



11. By computing the first few terms, guess what the limit of the following recursively defined sequence.



*There is more danger of numerical sequences continued indefinitely than of trees growing up to heaven. Each will some time reach its greatest height.*

- [Friedrich Ludwig Gottlob Frege](http://www.todayinsci.com/F/Frege_Friedrich/FregeFriedrich-Quotations.htm), **Grundgesetz der Arithmetik** (1893)