

**MAT 161-004 and MAT 161-300**  
**Main Topics for the Final Exam**  
**Wednesday, Dec. 14, 2011**  
**3:00 – 6:00 pm BR 161**

**In addition to the topics listed on the Main Topics for Tests 1 – 4, are these (covered after Test 4):**

**Applications of Integration**

Be able to:

- find the volume of a solid of revolution by the method of disks
- find the volume of a solid of revolution by the method of washers
- find the volume of a solid of revolution by the method of shells
- find the work done in stretching or compressing a spring
- find the work done in pumping liquid out of a container
- find the average value of a function

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Part I of Final Exam	Approx. 150 points	Without Maple
Part II of Final Exam	Approx. 50 points	Maple available

You must finish and hand in Part I before beginning Part II. You may begin Part II at any time (after completing Part I), but not later than 5:15 pm.

Maple syntax reminders on the back of this page will be provided on the exam.

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**Most important categories of problems**

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<b>Limits</b> <ul style="list-style-type: none"><li>• Determine from a graph</li><li>• Calculate by hand</li><li>• L'Hospital's Rule</li></ul>	<b>Applications</b> <ul style="list-style-type: none"><li>• Equation of tangent line</li><li>• Motion on a line</li><li>• Cost, revenue, profit</li><li>• Newton's Method</li><li>• Linearization</li><li>• Max/Min problems (especially fencing problems)</li><li>• Related rates</li></ul>
<b>Derivatives</b> <ul style="list-style-type: none"><li>• Use rules (including product, quotient, chain, etc.)</li><li>• Implicit</li><li>• Logarithmic</li></ul>	<ul style="list-style-type: none"><li>• Absolute max and min on <math>[a,b]</math></li><li>• Concavity/inflection points</li><li>• Area</li><li>• Volume</li><li>• Work</li></ul>
<b>Integrals</b> <ul style="list-style-type: none"><li>• Indefinite</li><li>• Definite</li><li>• Substitution</li><li>• Midpoint Rule</li></ul>	<ul style="list-style-type: none"><li>• Average value of a function</li></ul>

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