

Midterm Review

This exam covers sections 4.4, 4.9, 5.1-5.5, and 6.1-6.3 in your textbook. You should be able to do the following (associated textbook sections are listed in parentheses).

- Use l'Hospital's Rule to calculate an indeterminate limit. (4.4)
- Find general and specific antiderivatives of simple functions. (4.9)
- Estimate the area under a curve using left or right-hand sums with a given n . This may include calculating distance traveled by estimating the area under a velocity curve. (5.1)
- Evaluate a definite integral by interpreting it in terms of areas of geometric shapes. (5.2)
- Evaluate a definite integral with your calculator. (5.2)
- Evaluate a definite integral by applying the properties of integrals. (5.2)
- Find the derivative of a function of the form $g(x) = \int_a^x f(t) dt$ or $g(x) = \int_a^{h(x)} f(t) dt$. (5.3)
- Evaluate a function of the form $g(x) = \int_a^x f(t) dt$. (5.3)
- Evaluate a definite integral using basic antiderivative rules and the FTC. (5.3)
- Evaluate indefinite integrals using any of the facts from the box on page 398 of your textbook, except for the last two. (5.4)
- Use the net change theorem to find the total change in a quantity by calculating the integral of its rate of change, or create an integral that represents a requested total change. (5.4)
- Given a velocity function, calculate both distance traveled and displacement over an interval. (5.4)
- Use the substitution rule to calculate a definite or indefinite integral. (5.5)
- Calculate the area bounded by given curves. (6.1)
- Calculate the volume of a solid by slicing (this may include solids of revolution, or solid with a given base region and cross-sectional shape). (6.2)
- Calculate the volume of a solid using cylindrical shells. (6.3)

Additional Information:

- You may use one side of a 3-by-5 index card for notes.
- For some application problems, you may be asked to set up integrals that you don't know how to calculate yet. I'll either ask you to use your calculator or to leave the answer as an integral.
- You will not be required to sketch in 3D on the exam, though you can certainly do so if it will help you visualize a solid!

Please see the other side of the page for practice problems from the Chapter Reviews, but you should also review your WebAssign homework! Some topics are not covered very thoroughly in the Chapter Reviews, particularly the method of cylindrical shells.

Practice Problems

Note: A pencil icon in your eBook indicates a video solution!

Chapter 4 Review (page 352): 9, 13, 67

Chapter 5 Review (page 416): 1, 3, 5, 9, 13, 19, 25, 33, 43, 45, 56 (see key below), 57

Chapter 6 Review (page 457): 1, 5, 7, 9, 15, 23, 25

Chapter 5 Review, #56:

- a) $175/6$ meters
- b) $177/6$ meters