The exam will be aligned to the following MA 153 Course Goals and assess the following learning outcomes.

- Highlight the link of mathematics to the real world.
- Develop a wide base of mathematical knowledge, including
  - basic skills and concepts,
  - a functional view of mathematics, including graphical, algebraic, numerical, and contextual viewpoints,
  - properties and applications of some of the basic families of functions
  - geometric visualization,
  - problem solving, predicting, critical thinking, and generalizing.
- Incorporate the use of general academic skills such as
  - communicating mathematics concepts, and
  - understanding and using technology

1. Demonstrate correct use of function notation. Identify the independent and dependent variable and label the correct variable on the appropriate axis. Section 1.1 #1-15, 32, 33, 42-44
2. Determine if a graph, table, formula, or a verbal description is a function. Section 1.1 #16-26, 40, 41 and Example 6 on page 5 and Ch 1 Rvw #1-3, 6
3. Use the Rule of Four to sketch a function’s graph from a verbal description or match its table to its graph or story. Section 1.1 # 27-29
4. Identify intervals (if any) on which a function is increasing and decreasing Section 1.2 #1-5, 17, 25 and Example 1, 2, 3 on pp 11-12
5. Determine and interpret the value of the average rate of change from a table of values, a graph, or a formula of a function. Section 1.2 #5-8, 19,20, 22, 24, 31 and Example 2 and 4 on pp 12-14
6. Interpret the average rate of change of a function $f(x)$ on an interval from $x_1 = a$ to $x_2 = b$ as the slope of a segment which connects points $(a, f(a))$ and $(b, f(b))$, where $\frac{\Delta y}{\Delta x} = \frac{f(b) - f(a)}{b-a} = \frac{y_2-y_1}{x_2-x_1}$. Read the box on page 13. Section 1.2 #9-14, 20, 28
7. Given the formula of a linear function, find and interpret its slope and axis intercepts as well as sketch its graph. Section 1.3 #10-16, 22, 28, 29 and Section 1.4 #47-54
8. Find a linear model if given an initial value and an average rate of change (or slope). Section 1.1 #46 and Section 1.3 - #17, 18, 19, 22, and Section 1.4 #2, 39, 57 and Section 1.5 #31, 32 and Chapter 1 Review #
9. Find a linear model if given any value (not necessarily its initial value) and an average rate of change (or slope). Section 1.3 # 22, 28 and Section 1.4 #1, 2, 4, 6, Section 1.5 # 10,11,
10. Find a linear model if given any two points. Section 1.4 #3, 5, 7-15, 37, 38, 40, 50, 52-54, 60, 61 Section 1.5 #28
11. Determine if a table of values of a function represents linear growth or linear depreciation. Section 1.3 #4-9, 14, 15 and Section 1.4 #45 Ch 1 Review # 9,10
12. Understand the geometric properties of linear functions including:
   - when two lines are parallel and when they are perpendicular
   - when their y-intercepts are positive or negative
   - when they are increasing or decreasing (or neither)
   Section 1.4 # 31-36, 42-44, 46,and Section 1.5 #1-4, 8, 9,18, 19
13. Construct linear models and find intersection points to solve problems and make predictions. Section 1.5 # 10, 11, 16, 28 and Example 3 on pp 39-40
14. Evaluate functions with values that are expressions as well as numbers. Section 2.1 #1-34, 40-42, 44 and Chapter 2 Review #1 – 12, 20, 21 49, 52, 53, 54
15. Solve equations and inequalities algebraically and graphically. Interpret the results. Section 2.1 #1-34, 40-42, 44 and Chapter 2 Review 66, 67
16. Determine the domain and range of a function if represented by a graph, table, formula, or verbal description. Section 2.2 #1-29, 31 and Chapter 2 Review #15-19, 72, 73
17. Use a graphing calculator to graph a function in an appropriate viewing window. Use built-in calculator features such as an intersection point finder, maximum/minimum finder, or zero finder to solve problems. Section 1.3 #32-36
18. Interpret expressions or equations which involve function notation and inverse function notation. Section 1.1 #35 and Section 1.3 # 29 and Section 2.5 – 1-59 and Chapter 2 Review 34-35, 56, 58,59, 60, 62, 63, 65, 68
19. Determine the concavity of a function. Section 2.6 #1-27 and Chapter 2 Review 55

Start your review by doing the following:

**Strengthen Your Understanding Chapter 1** (page 60): 1-45
**Strengthen Your Understanding Chapter 2** (page 113-114): 1-18, 30-37, 41-46