This review, produced by the Broward Teaching Center, contains a collection of questions which are representative of the type you may encounter on the exam. Other resources made available by the Teaching Center include:

- Walk-In tutoring at Broward Hall
- Private-Appointment, one-on-one tutoring at Broward Hall
- Walk-In tutoring in LIT 215
- Supplemental Instruction
- Video resources for Math and Science classes at UF
- Written exam reviews and copies of previous exams

The teaching center is located in the basement of Broward Hall:

You can learn more about the services offered by the teaching center by visiting https://teachingcenter.ufl.edu/
1. Solve the following inequalities.
   (a) \( x^5 > 27x^2 \) 
   (b) \( x(x - 1)^2(x + 2)^3(2x + 1)^4 \leq 0 \) 
   (c) \( x^3 - 9x - 2 \geq 2x^2 - 20 \) 
   (d) \( \frac{3x}{x - 1} \leq \frac{x}{x + 4} + 3 \)

2. Solve the following systems of linear equations.
   (a) \[
   \begin{align*}
   2x - 4y &= 6 \\
   7x + 3y &= 4 
   \end{align*}
   \]
   (b) \[
   \begin{align*}
   \frac{3}{4}x - \frac{2}{3}y &= -1 \\
   -9x + 8y &= 12 
   \end{align*}
   \]

3. Solve the following systems of equations.
   (a) \[
   \begin{align*}
   x^2 + y^2 &= 10 \\
   2y - x &= -1 
   \end{align*}
   \]
   (b) \[
   \begin{align*}
   x + 2y &= 1 \\
   y &= \sqrt{4 - x} 
   \end{align*}
   \]

4. Ten liters of a 50\% acid solution is to be made by mixing a 20\% solution with a 60\% solution. How many liters of each solution is required to obtain the final mixture?

5. Let \( f(x) = \frac{64(x - 1)^2x^4(2x + 1)^2(x - 2)(3 - x)}{(x - 1)^2(x + 5)^32x^2(x - 2)^3} \).
   (a) Find all roots, asymptotes, and holes in the graph of \( f(x) \).
   (b) For what values of \( x \) is \( f(x) \) positive? For what values of \( x \) is \( f(x) \) negative? Express answers in interval notation.

6. Given the fact that \( -3i \) is a root of the polynomial \( f(x) = x^4 + 2x^3 + x^2 + 18x - 72 \),
   (a) Find all other roots.
   (b) Factor the polynomial into a product of linear terms.
7. Sketch the graphs of the rational functions below.
   (a) \( f(x) = \frac{x^2 - 1}{x - 1} \)
   (b) \( g(x) = \frac{x^2 - x - 2}{x^3 - 2x^2 - 5x + 6} \)

8. Which of the following statements about polynomials with Real coefficients are true and which are false? Provide examples and counterexamples to justify your claims.
   (a) A polynomial of degree three can have only one real zero.
   (b) A polynomial of degree four can have three non-real zeros.
   (c) A polynomial of degree five can have only one real zero with multiplicity two.
   (d) A polynomial of degree six can have no real zeros.
   (e) A polynomial of degree six can have a non-real zero with multiplicity six.

9. Determine the end behavior following polynomial functions
   (a) \( f(x) = -5x^3 + 3x - 2 \)
   (b) \( g(x) = x^3 - 10x^6 + 12 \)
   (c) \( h(x) = 3(x - 1)^3x^2 \)

10. Use the polynomial remainder theorem to evaluate
    (a) \( f(3) \) where \( f(x) = 6x^3 - 5x^2 + 4x - 17 \)
    (b) \( f(-4) \) where \( f(x) = x^6 + 5x^5 + 5x^4 + 5x^3 + 2x^2 - 10x - 8 \)