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. Answer the following true or false questions. If false, provide an example to show why it is false.

Let $a$, $b$, and $c$ be Real numbers.

A. **Closure**: $a + b, a - b, ab, \frac{a}{b}$ are all Real numbers.

B. **Associative**: $(a + b) + c = a + (b + c)$

C. **Distributive**: $a(b - c) = ab - ac$ for all Real numbers $a$, $b$, and $c$.

D. **Inverse**: $a \cdot \frac{1}{a} = 1$ for all Real numbers $a$.

E. **Commutative**: $a - b = b - a$

2. State the **smallest** set (natural, whole, integer, etc) the following real numbers belong to:

   A. $-\frac{21}{7}$
   
   B. $-\frac{0}{\pi}$
   
   C. $-\frac{\pi}{0}$
   
   D. $\sqrt{9}$
   
   E. $\sqrt{3}$
   
   F. 2.757575....
   
   G. $\frac{17}{25}$

3. Identify the following complex numbers as pure imaginary or nonreal complex:

   a) $7 - i$
   
   b) $3 + 2i$
   
   c) $4 + 2i$
   
   d) $-2 - 3i$
   
   e) $7i$
   
   f) $-2i$
   
   g) $-5 + 4i$
4. **Simplify:**
   a) $i^{40}$
   b) $i^{22}$
   c) $i^7$
   d) $i^{102}$
   e) $i^{57}$
   f) $i^{120}$

5. **Simplify:**
   a) $(4 + 7i) + (2 + 3i)$
   b) $(5 + 6i) + (7 - 3i)$
   c) $(4 + 7i) - (2 + 3i)$
   d) $(5 + 6i) - (7 - 3i)$

6. Factor the following trinomials completely, if possible.
   a) $x^2 - 2x - 48$
   b) $x^2 + 2xy - 15y^2$
   c) $5x^3 + 5x^2y - 30xy^2$

7. Solve the following equations.
   A. $\frac{2}{3x} - 2 = \frac{3}{2x}$
   B. $\frac{1}{x} + \frac{2}{13x} = 5$
   C. $\frac{8}{x-2} + \frac{8}{x+2} = 3$
   D. $-5[-3x - 3 - 6(x + 1)] = -5x + 2$

8. Solve the following equations.
   A. $x^2 + 3x - 9 = 0$
   B. $x^2 - 10x + 61 = 0$
   C. $\frac{-5}{x - 8} + \frac{8}{x + 8} = \frac{-80}{x^2 - 64}$
9. Simplify the following. 
\[ \frac{\sqrt{-75}}{\sqrt{3}} \]

10. Find the quotient. 
\[ \frac{2p - 2}{p} \cdot \frac{9p^2}{4p - 4} \]

11. Solve the equation. 
\[ \sqrt{x + 4} = x - 4 \]

12. Solve the equation. 
\[ (x - 6)^{2/5} = 4 \]

13. Solve the inequality. 
\[ -7 - 11x - 3 \geq -12x - 4 \]

14. Solve the equation. 
\[ \sqrt{x + 7 + 5} = x \]

15. Solve the system of equations. 
\[ 3x + 4y = 0 \]
\[ 2x + 3y = 1 \]

16. For the following polynomial, one zero is given. Find all the others. 
\[ P(x) = x^3 + 7x^2 - 16x + 18 \] (Zero: 1 + i)

17. Find all complex zeros of the polynomial function. 
\[ f(x) = x^4 - 21x^2 - 100 \]

18. Factor \( f(x) \). 
\[ f(x) = x^3 + 4x^2 - x - 4 \]

19. Find a polynomial of degree 3 with real coefficients that satisfies the given conditions. 
Zeros of -2, 1, 0 and \( p(2) = 16 \).

20. Solve the following equations:
   a) \( 3^{x-2} = 81 \)
   b) \( 2^x = 64 \)
   c) \( 4^{x-3} = \frac{1}{16} \)
   d) \( \log_4 x = 3 \)
   e) \( \ln(x + 4) = \ln 7 \)
   f) \( \ln x - \ln 3 = 4 \)
   g) \( \log_2 2x = \log_2 100 \)
   h) \( \log_3 (2x + 1) = 2 \)
   i) \( \log_7 3 + \log_7 x = \log_7 32 \)
   j) \( 2 \log_4 x - \log_4 (x - 1) = 1 \)