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/](https://teachingcenter.ufl.edu/)
1. Convert the following logarithms into an exponential function to solve for $x$:
   a. $\log_2 x = 5$
   b. $\log_4 x = 2$
   c. $\log_8 x = 1$
   d. $\log_3 x = 4$
   e. $\log_7 x = 7$
   f. $\log_6 x = 0$

2. Solve the following equations:
   a) $\ln (x - 1) = 2$
   b) $\ln (x - 9) + \ln x = 1$
   c) $\ln x + \ln (x + 9) = 1$
   d) $\log (x + 3) - \log x = 1$
   e) $\log (x + 4) - \log x = 2$
   f) $\log (3x^2 + 2x - 4) = 0$

3. Solve the following equations:
   a) $\ln (x + 3) = \ln x + \log 3$
   b) $-\ln (x - 2) = 1 - \ln (x^2 - 4)$
   c) $\log (x^2 - 1) = 1 + \log (x - 1)$
   d) $\log_2 (2 - 2x) + \log_2 (1 - x) = 5$

4. Solve the following equations:
   a) $e^x = 5$
   b) $8^x = 4$
   c) $-6 + \ln 3x = 0$
   d) $3^{x-2} = 81$
   e) $\log_2 2x = \log_2 100$
   f) $\ln(x + 4) = \ln 7$

5. Solve the following equations:
   a) $5^x = 25$
   b) $2 \log_6 4x = 0$
   c) $2^x = 64$
   d) $4^{x-3} = \frac{1}{16}$

6. Solve the following equations:
   a) $\log_7 3 + \log_7 x = \log_7 32$
   b) $4 \log_5 (x + 1) = 4$
   c) $\log_2 (x + 5) - \log_2 (x - 2) = 3$
   d) $2 \ln 3x = 4$

7. Solve:
   a) $2 \log_4 x - \log_4 (x - 1) = 1$
   b) $\log x - \log 6 = 2 \log 4$
   c) $3^x = 500$
   d) $8^x = 1000$

8. Solve:
   a) $\log_2 x + \log_2 (x - 3) = 2$
   b) $5^{x+2} = 4$
   c) $\log_2 x + \log_2 3 = 3$
   d) $4^{-3x} = 0.25$
9. Find the domain of the function $f + g$ for the functions $f(x) = \sqrt{x}$ and $g(x) = \sqrt{2 - x}$.

10. Find $\frac{g}{f}$ and its domain if $f(x) = \frac{x^2}{x + 2}$ and $g(x) = \frac{x}{x^2 - 4}$.

11. Find two functions $f$ and $g$ so that $(f \circ g)(x) = (x^2 + 1)^{3/2}$.

12. Find $f \circ g$, $g \circ f$ and their domains for $f(x) = x^2$ and $g(x) = \sqrt{1 + x}$.

13. Find $f \circ f$ and its domain if $f(x) = \frac{2}{x - 1}$.

14. Let $f(x) = \frac{1}{9}(\sqrt{x + 2} - 3)$ and $g(x) = 3x + 1$. Find the composite $(f^{-1} \circ g^{-1})(x)$.

15. (a) Given $f(x) = 5 - 2x$, find $f^{-1}(x)$

(b) Given $f(x) = x^2 - 3x$ and $g(x) = 2x + 5$, compute $(g - f)(x)$

(c) Given $f(x) = \frac{1}{\sqrt{x - 2}}$ and $g(x) = x^3$, find $f \circ g$

16. Which of the following functions are one-to-one? Hint: consider the graphs

(a) $f(x) = \sqrt{x + 5}$  (b) $g(x) = 1 - x^2$  (c) $h(x) = \frac{1}{x + 2}$  (d) $r(x) = |x - 2|$

17. Find the inverse of the following one-to-one functions and their domain and range:

(a) $f(x) = 2x - 3$  (b) $f(x) = \frac{x - 5}{x + 2}$  (c) $f(x) = \sqrt{x + 1} + 2$
18. Use synthetic division to reduce the fraction: \( \frac{x^4 - 2x^2 + 9x - 36}{x - 3} \).

19. Divide \(3x^3 - 2x^2 + 3x - 4\) by \(x - 3\) using synthetic division.

20. List all possible rational zeroes of \(f(x) = x^5 + x^3 + 2x^2 - 12x + 8\).

21. Given that 3 is a zero of \(f(x) = x^4 - 3x^3 + 6x^2 + 2x - 60\) find all real and complex zeroes and factor completely.

22. Write the polynomial \(x^6 - x^5 - 9x^4 + 13x^3 + 8x^2 - 12x\) as a product of linear factors (factor the polynomial completely).

23. 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.

24. Find the domain of the following functions:
   (a) \(f(x) = \frac{x}{x - 6}\)
   (b) \(f(x) = \frac{x+5}{(x+3)(x-2)}\)

25. Solve the following equations.
   a) \(\frac{-5}{x - 8} + \frac{8}{x + 8} = \frac{-80}{x^2 - 64}\)
   b) \(2 - \frac{6}{4x + 2} = \frac{3}{-36x - 18}\)