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) \( \frac{2x - 1}{x} < x \)
   (b) \( \frac{x + 6}{x + 1} > 2 \)
   (c) \( x^4(x - 3) < 0 \)
   (d) \( \frac{1}{2}x^5 \leq 32x^2 \)

2. Solve the following systems of equations:
   (a) \[
   \begin{align*}
   -x + 2y &= -2 \\
   3x + y &= 20
   \end{align*}
   \]
   (b) \[
   \begin{align*}
   x^2 + y^2 &= 25 \\
   (x - 8)^2 + y^2 &= 41
   \end{align*}
   \]
   (c) \[
   \begin{align*}
   y &= x^2 - x - 1 \\
   y &= x - 1
   \end{align*}
   \]

3. Consider the system of equations \[
   \begin{align*}
   \frac{x + 3}{4} + \frac{y - 1}{3} &= 1 \\
   2x - y &= 12
   \end{align*}
   \]
   (a) Graph the equations in the system.
   (b) Locate the intersection of the two graphs, if one exists.
   (c) Solve the system algebraically, if possible.

4. Solve the following equations for \( x \):
   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) \( 2 \log_4 x - \log_4 (x - 1) = 1 \)

5. Graph the following exponential functions:
   (a) \( f(x) = \left( \frac{1}{3} \right)^{1-x} - 1 \)
   (b) \( g(x) = 2^{x-2} + 1 \)
   (c) \( h(x) = 2e^{-x} - 2 \)
6. Solve the following equations for \( x \):
(a) \( 4^{x^2-1/2} = \frac{1}{2} \)
(b) \( \log(x + 4) - \log(x) = \log(x - 2) \)
(c) \( 27^{x-2} = 3^x \)
(d) \( \ln(x^2 - 2) = \ln(23) \)
(e) \( \frac{1}{5^{x+1}} = 125^{-1} \)
(f) \( \log_3(x) = \log_{\sqrt{2}}(5) \)

7. Find the domain of the following functions:
(a) \( f(x) = \ln(1 - x^2) \)
(b) \( g(x) = \frac{\log(x - 2)}{\sqrt{x^2 - x + 3}} \)
(c) \( h(x) = \ln \left( \frac{x + 6}{2 - x} \right) \)

8. Rewrite the expression using a single logarithm: \( \ln(x^2 + 1) - \ln(e^{2x}) + \log_2(\sqrt{x - 3}) \).

9. Plot the following logarithmic functions. Specify any intercepts and asymptotes.
(a) \( f(x) = \log_2(x) + 2 \)
(b) \( g(x) = \ln(x - 1) \)
(c) \( h(x) = \ln(x + 2) - 1 \)

10. Expand the logarithmic expression: \( \ln \left( \frac{y^2}{\sqrt[3]{x^3(x^2 + 3)}} \right) \)

11. Solve the equations
(a) \( 2x^2 e^{2x} + 2xe^{2x} = 0 \)
(b) \( 2x \ln(x) + x = 0 \)
(c) \( \frac{1 + \ln(x)}{2} = 0 \)
12. The number, $N$, of trees per acre of a certain pistachio farm is modeled by $N = 63\left(10^{-0.04x}\right)$ where $x$ is the average diameter (in inches) of the trees. If the average number of pistachio trees per acre is 21, what does this model predict the average diameter of the trees to be?

13. A game preserve has a carrying capacity of 1000 animals. The growth of the population at the preserve is modeled by the logistic curve $P(t) = \frac{1000}{1 + 9e^{-0.1656t}}$ where $t$ is measured in months.
   (a) Estimate the population after 5 months
   (b) After how many months will the population be 500?

14. What principal, $P$, must be invested at rate $r = 3.5\%$ in order to mature to $750,000$ within 15 years, if interest is compounded monthly?

15. Determine the time necessary for a principal of $P$ dollars to double when invested at a rate of 4.5\%, compounded
   (a) monthly.
   (b) continuously.

16. For each of the following angles, determine what quadrant the angle lies in, express the angle in both degrees and radians, find an angle in $[0, 2\pi)$ which is coterminal to the angle given.
   (a) $-420$ degrees
   (b) $13\pi/2$
   (c) $540$ degrees

17. The blade on a circular saw revolves at 5000 revolutions per minute.
   (a) Find the angular speed of the blade in radians per minute.
   (b) Suppose the blade has a diameter of 7.25 inches. Find the linear speed of the blade’s outer edge.