MATH 1643: Bonus Quiz to Review for Exam #2

Write your answers on the given answer sheet.

1. Find the vertical asymptote(s) of \( f(x) = \frac{x + 3}{x^2 - 9} \).
   
   A) \( x = 3 \) and \( x = -3 \)
   B) \( x = 3 \)
   C) \( x = -3 \)
   D) \( x = 9 \)
   E) There is no vertical asymptote.

2. Which of the following is NOT true about \( f(x) = b^x \), for \( b > 1 \)?
   
   A) The domain is all real numbers.
   B) The range is \((0, \infty)\).
   C) The graph of this function is decreasing.
   D) There is no x-intercept.
   E) The y-intercept is \((0, 1)\).

3. What is the maximum number of turning points the function \( f(x) = x^{998} + x^{997} - x^{652} + 3 \) can have?
   
   A) 998
   B) 997
   C) 652
   D) 3
   E) None of these.

4. Evaluate \( \log_6 33 \)
   
   A) .78
   B) 1.52
   C) 27
   D) 1.95
   E) None of these.

5. Which of the following is NOT true about \( f(x) = \log_4 x \)?
   
   A) The domain is all real numbers.
   B) The range is all real numbers.
   C) The graph of this function is increasing.
   D) There is no y-intercept.
   E) The x-intercept is \((1, 0)\).
6. Solve the equation: \[ 2 \ln x = \ln 81 \]
   A) \( x=9 \) and \( x=-9 \)
   B) \( x=-9 \)
   C) \( x=81 \)
   D) \( x=9 \)
   E) No solution.

7. The Intermediate Value Theorem shows that the function \( f(x) = x^2 - 6x - 7 \) has a zero in which of these intervals?
   A) Between -4 and -2
   B) Between -2 and 0
   C) Between 0 and 2
   D) Between 2 and 4
   E) None of these.

8. If \( m \) and \( n \) are inverse functions, then find \( (m \circ n)(-8) \):
   A) 1/8
   B) -1/8
   C) 8
   D) -8
   E) Not enough information given to find the answer.

9. The city of Austin, TX smells horrendous. Most scientific researchers have come to believe that the stench comes mostly from the University of Texas campus. As a result, people have been leaving the city at a rate of 3% per year (personally, I would leave faster). Given that the population of Austin was 1,500,000 in 2006, how many people will be left in Austin in 2020? Use the formula \( A = A_0e^{kt} \).
   A) 1,245,546
   B) 2,282,943
   C) 985,571
   D) 1,885,234
   E) Not enough information given to find the answer.

10. Given the functions below, find the value of \( (m \circ n)(2) \).
    
    \[
    \begin{array}{c|cccc}
    x & 1 & 2 & 3 & 4 \\
    \hline
    m(x) & 2 & 4 & 1 & 3 \\
    n(x) & 4 & 3 & 2 & 1 \\
    \end{array}
    \]