3. [10 points] Suppose:
   • \( f(x) \) is a function with domain \((-2, 5]\).
   • \( g(x) = f(x + 5) + 4 \).
   • \( h(x) = 3 + 2^x \).
   • \( j(x) = -7 + 0.6^x \).

You do not need to show any work for this problem, but you may receive partial credit for correct work shown. Please be sure to circle your answers in all parts of this problem.

a. [3 points]
   What is the domain of \( g(x) \)? Give your answer using inequalities.
   
   Solution: The graph of \( g(x) \) is the graph of \( f(x) \) shifted 5 units to the left, so the domain of \( g(x) \) can be obtained by shifting the domain of \( f(x) \) accordingly, giving us
   \[-7 < x \leq 0\]

b. [3 points]
   The point \((4, -7)\) lies on the graph of \( f(x) \). What point MUST lie on the graph of \( g(x) \)?
   
   Solution: Since the graph of \( g(x) \) is a shift of the graph of \( f(x) \) by 5 units left and 4 units up, the related point on \( g(x) \) is the point \((4, -7)\) shifted the same way, giving us \((-1, -3)\)

c. [2 points]
   The horizontal asymptote of \( y = h(x) \) is:
   
   Solution: The horizontal asymptote of \( 2^x \) is \( y = 0 \), and since the graph of \( h(x) \) is the graph of \( 2^x \) shifted up by 3, \( h(x) \) has horizontal asymptote \( y = 3 \)

d. [2 points]
   \[ \lim_{x \to \infty} (j(x)) = \]
   
   Solution: We know \( \lim_{x \to \infty} 0.6^x = 0 \), and since the graph of \( j(x) \) is the graph of \( 0.6^x \) shifted down by \(-7\), we get that
   \[ \lim_{x \to \infty} j(x) = -7 \]