1. Given that \( g(x) = \sqrt{x + 1} \) find and simplify the difference quotient \( \frac{g(x + h) - g(x)}{h} \), when \( h \neq 0 \).

A. 1  B. \( \frac{1}{\sqrt{x + 1} + \frac{h}{\sqrt{x + 1}}} \)  C. \( \sqrt{x + 1}(x - 1) \)  D. \( \frac{\sqrt{x + 1}(x + h - 1)}{h} \)  E. None of these

2. Given \( f(x) = x^2 + 1 \) and \( g(x) = 5x - 3 \), find and simplify \((f \circ g)(x)\).

A. \( 25x^2 - 30x + 10 \)  B. \( 25x^2 - 9 \)  C. \( 25x^2 + 9 \)  D. \( 5x^3 - 3x^2 + 5x - 3 \)  E. None of these

3. Solve \( x^3 - 3x^2 + 4x - 2 = 0 \).

A. \( x = 1, -2 \)  B. \( x = 2 \)  C. \( x = 1 \pm i \)  D. \( x = 1, 1 \pm i \)  E. None of these

4. Find the domain of \( h(x) = \sqrt{10 - x} \).

A. \((10, \infty)\)  B. \((-\infty, \infty)\)  C. \((-\infty, 10]\)  D. \([10, \infty)\)  E. None of these

5. Find the function that results from applying the following transformations to \( g(x) = x^3 \): Reflect about the \( x \)-axis, shift left 2 units and shift down 3 units

A. \( -(x + 2)^3 - 3 \)  B. \( (x + 2)^3 + 3 \)  C. \( -(x - 3)^3 + 2 \)  D. \( -(x + 3)^3 - 2 \)  E. None of these

6. Given that \( \sin(t) = \frac{5}{13} \), with \( t \) in quadrant II, find \( \tan(t) \)

A. \( \tan(t) = \frac{5}{12} \)  B. \( \tan(t) = -\frac{5}{12} \)  C. \( \tan(t) = \frac{12}{13} \)  D. \( \tan(t) = \frac{12}{13} \)  E. None of these
7. Suppose that a rabbit population in thousands is modeled by \( f(x) = \frac{5x + 1}{2x + 10} \) where \( x \geq 0 \) is years.
What does the population tend to in the long run?

A. 500 rabbits  
B. infinity  
C. 0 rabbits  
D. 2500 rabbits  
E. None of these

8. Identify the curve \( f(x) = \sqrt{9 - x^2} \)

A. After simplification, this is the straight line \( f(x) = 3 - x \)  
B. There is no established name for this curve.  
C. It's a parabola that opens downward.  
D. It's a circle with radius 3.  
E. It's a hyperbola.

9. Pick the correct identity.

A. \((a + b)^2 = a^2 + b^2\)

B. \( \frac{a + b + c}{c} = a + b \)

C. \( \frac{a + b + c}{c} = a + b + 1 \)

D. \( \ln(ab) = \ln(a) + \ln(b) \)

E. \( \frac{1}{a + b} = \frac{1}{a} + \frac{1}{b} \)

10. If \( f(x) = 3x + 1 \) then

A. \( f^{-1}(x) = 3x \)

B. \( f^{-1}(x) = \frac{1}{3x + 1} \)

C. \( f^{-1}(x) = \frac{1}{3}(x - 1) \)

D. \( f^{-1} \) does not exist

E. none of these.