Calculus readiness test sample questions

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The Calculus readiness test calculus.sfsu.edu/ready is a series of multiple choice questions randomly picked from three collections a) basic algebra, b) basic skills involving the concept of functions, and c) geometry and basic trigonometry. Below are two problem samples from each collection. Upon passing the test, the student is issued a unique passcode. The passcode is non transferable and it expires upon handing it to the instructor.

1. Let \( f(x) = \frac{1}{2}x^2 \). The fraction \( \frac{f(a+h)-f(a)}{h} \) is
   A. \( a + \frac{1}{2}h \).
   B. \( \frac{1}{h} \left[ \frac{1}{2}x^2(a + h) - \frac{1}{2}x^2(h) \right] \).
   C. \( a \).
   D. \( 2x \).
   E. \( 2a \).

2. For what values \( a \) is the equation \( \frac{1}{a+2} = \frac{1}{a} + \frac{1}{2} \) true?
   A. no real values \( a \).
   B. all \( a \).
   C. all \( a \neq 0 \).
   D. all \( a \neq -2 \).
   E. \( a = 2 \).

3. Let \( f(x) = x^2 \). On the interval \([2, 3]\), the value of \( f \) increases by
   A. 125%.
   B. 2%.
   C. 3%.
   D. it doubles.
   E. 500%.

4. Let \( f(x) = \frac{x-1}{x+1} \). Then the inverse of \( f \) is given by
A. \( f^{-1}(x) = \frac{x+1}{x-1} \).
B. \( f^{-1}(x) = \frac{x+1}{x-1} \).
C. \( f^{-1}(x) = -\frac{x-1}{x+1} \).
D. \( f^{-1}(x) = (x+1)(x-1) \).

5. Let \( R \) be the radius of the circle circumscribed in the triangle of sides 1968, 1968, 1968 and let \( r \) denote the radius of the circle inscribed in this triangle.

Then the ratio \( \frac{R}{r} \) is

A. 2.
B. \( \tan \frac{\pi}{6} \).
C. \( \cos \frac{\pi}{3} \).
D. 1968.
E. \( \sqrt{3} \).

6. Determine for what values of \( t \), \( \sin t = \cos t \).

A. \( t = \frac{\pi}{4} + \pi \cdot k \) where \( k \) is an integer.
B. no matter what value of \( t \) is, \( \sin t \) is always different than \( \cos t \).
C. \( t = \pi \).
D. \( t = 0 \).
E. \( t = \tan t \).