AP Calculus AB Unit 1 Free Response Practice

1971 AB 1

Let f (x) = ln(x) for all x >0, and let g(x) = x^2 - 4 for all real x. Let H be the composition of f with g, that is, H(x) =f(g(x)). Let K be the composition of g with f, that is, K(x)= g(f(x)).
   a. Find the domain of H.
   b. Find the range of H.
   c. Find the domain of K.
   d. Find the range of K.
   e. Find H'(7).

1973 AB 1

Given f(x) = x^3 -6x^2 + 9x and g(x) = 4.
   a. Find the coordinates of the points common to the graphs of f and g.
   b. Find all the zeros of f.

1974 AB 1 BC 1

Given f(x) = | sin x | , -π ≤ x ≤ π, and g(x) = x^2 for all real x.
   a. On the axes provided, sketch the graph of f.
   b. Let H(x) = g(f(x)). Write an expression for H(x).
   c. Find the domain and range of H.

1975 AB 1

Given the function f defined by f(x) = ln (x^2 - 9).
   a. Describe the symmetry of the graph of f.
   b. Find the domain of f.
   c. Find all values of x such that f(x) = 0.
   d. Write a formula for $f^{-1}(x)$, the inverse function of f, for x > 3.

1977 AB 1

Let f(x) = cos(x) for 0 ≤ x ≤ 2 π, and let g(x) = ln(x) for all x > 0. Let S be the composition of g with f, that is, S(x) = g(f(x)).
   a. Find the domain of S.
   b. Find the range of S.
   c. Find the zeros of S.

1981 AB 4

Let f be the function defined by f(x) = $5^{\sqrt{2x^2-1}}$.
    a. Is f an even or odd function? Justify your answer.
    b. Find the domain of f.
    c. Find the range of f.
    d. Find $f'(x)$.

1988 AB 1

Let f be the function given by $f(x) = \sqrt{x^4 - 16x^2}$.
    a. Find the domain of f.
    b. Describe the symmetry, if any, of the graph of f.

1989 AB 4

Let f be the function given by $f(x) = \dfrac{x}{\sqrt{x^2 - 4}}$.

    a. Find the domain of f.
    b. Write an equation for each vertical asymptote to the graph of f.
    c. Write an equation for each horizontal asymptote to the graph of f.

1995 AB 1

Let f be the function given by $f(x) = \dfrac{2x}{\sqrt{x^2 + x + 1}}$.

    a. Find the domain of f. Justify your answer.
    b. In the viewing window [-5, 5] x [-3, 3], sketch the graph of f.
    c. Write an equation for each horizontal asymptote of the graph of f.