1.) Consider function $f(x) = \dfrac{1}{x} + 3$. Determine a function $g(x)$ so that

    a.) $f(g(x)) = x^3 + x^2$ b.) $f(g(x)) = 5f(x)$ c.) $f(g(x)) = g(x)$

2.) Write the volume of a cube as a function of its surface area. Use your result to find the volume of a cube of surface area 24 square feet.

3.) Determine the domain and range for each function.

    a.) $f(x) = \ln(x^2 - 4)$ b.) $g(x) = \dfrac{e^x}{1000 + e^x}$

    c.) $h(x) = \dfrac{6}{3 - \sqrt{x^2 - 16}}$ d.) $f(x) = \sqrt{\dfrac{(x-1)(x-2)}{(x+3)(x+2)}}$

4.) Compute the following limits.

    a.) $\displaystyle\lim_{x \to \frac{\pi}{4}} \tan x$ b.) $\displaystyle\lim_{x \to \frac{\pi}{2}^+} \tan x$ c.) $\displaystyle\lim_{x \to 8} \dfrac{x^{1/3} - 2}{x - 8}$

    d.) $\displaystyle\lim_{x \to 0^-} \sin(1/x)$ e.) $\displaystyle\lim_{x \to -1} \dfrac{x^2 + 6x + 5}{x^3 + 1}$ f.) $\displaystyle\lim_{x \to -\infty} \dfrac{\sqrt{9x^2 + 16}}{x + 1}$
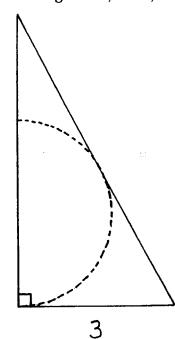
5.) Use the Intermediate Value Theorem (IMVT) to verify that the following equation is solvable. This is a writing exercise as well as a math exercise. Please be organized, clear, and precise in your writing : $x^3 = 10 + \sqrt{x}$

6.) Determine the radius of the inscribed semi-circle.

++

The following problem is for recreational purposes only.

7.) Plant 10 trees in 5 straight rows of four trees each.

4

1

3