Functions

1. If $f(x) = x^3 + 4x - 3,$ find $f(1), f(-1), f(0), f(\sqrt{2})$

2. Sketch the graph and determine the domain and range of f

   a) $f(x) = -4x + 3$ b) $f(x) = 3$

   c) $f(x) = \sqrt{36 - x^2}$ d) $f(x) = \sqrt{x^2 - 49}$

   e) $f(x) = \dfrac{1}{x-4}$ f) $f(x) = \dfrac{5}{x^2 - x - 12}$

   g) $f(x) = |x - 4|$ h) $f(x) = 2 - \sqrt{x}$

3. Find the sum, difference and product of f and g

   a) $f(x) = 3x^2, g(x) = \dfrac{1}{2x-3}$ b) $f(x) = x^3 + 3x, g(x) = 3x^2 + 1$

   c) $f(x) = 2x^3 - x + 5, g(x) = x^2 + x + 2$

4. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ where $(f \circ g)(x) = f(g(x))$

   a) $f(x) = 2x^2 + 5, g(x) = 4 - 7x$ b) $f(x) = \sqrt{2x+1}, g(x) = x^2 + 3$

   c) $f(x) = 2x - 3, g(x) = \dfrac{x+3}{2}$

5. Graph the following functions and determine the value of y as x gets close to the indicated value.

   b) $f(x) = \dfrac{x-4}{x^2 - x - 12}$ as x gets close to 4 b) $f(x) = \dfrac{x^3 - 27}{x^2 - 9}$ as x gets close to 3

   c) $f(x) = \dfrac{4 - x^2}{3 - \sqrt{x\ +5}}$ as x gets close to 2 d) $f(x) = \dfrac{3x-2}{9x+7}$ as x gets close to ∞

   e) $f(x) = \dfrac{2x^3}{x^2 + 1}$ as x gets close to ∞