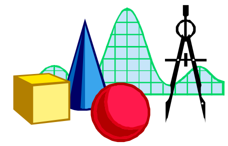
CHAMPLAIN REGIONAL COLLEGE ST. LAWRENCE

MATH DEPT.
TUTORIAL 6



Tutorial 6: Functions: graphs, addition, product, division, composite functions, inverse functions.

1. Sketch the graph of each of the following functions.
   - (i) $f(x) = -2x + 5$
   - (ii) $f(x) = x^2 - 3$
   - (iii) $f(x) = \dfrac{1}{x+1}$
   - (iv) $g(x) = |x - 2|$
   - (v) $g(x) = |x| - 2$
   - (vi) $f(x) = \begin{cases} x^2 & \text{if } x \le 1 \\ x & \text{if } x > 1 \end{cases}$

2. Specify the domain and range of each of the following functions.
   - (i) $y = x^2 + x - 1$
   - (ii) $y = \sqrt{x+2}$
   - (iii) $y = \dfrac{2x+5}{x-2}$
   - (iv) $y = \sqrt{x^2 - 4}$
   - (v) $y = \dfrac{5x}{x^2 - 5x}$

3. For each pair of functions f(x) and g(x), find, f+g, f – g, fg, and $\dfrac{f}{g}$, and specify their domains.
   - (i) $f(x) = x - 3$, $g(x) = 2x + 1$
   - (ii) $f(x) = x^2 - 1$, $g(x) = x^2 + 4x + 3$
   - (iii) $f(x) = \sqrt{x^2 - 4}$, $g(x) = \sqrt{9 - x^2}$

4. Given f(x) and g(x) , find f(g(x)) and g(f(x)) and specify the domain of each.
   - (i) $f(x) = x - 3$, $g(x) = 2x+1$
   - (ii) $f(x) = \sqrt{x}$, $g(x) = |x|$
   - (iii) $f(x) = x^5$, $g(x) = 3x^2 - 2x + 1$
   - (iv) $f(x) = \sqrt{x - 5}$, $g(x) = x^2 - 4$
   - (v) $f(x) = x^{1/3}$, $g(x) = x^2 - 1$

5. For each of the following functions f , find the inverse function f^{-1}. Graph f and f^{-1} and specify the domain and range of each.
   - (i) $f(x) = 3x + 1$
   - (ii) $f(x) = x^2 - 4$, $x \le 0$
   - (iii) $f(x) = \sqrt{2x - 1}$ $x \ge 1/2$