1. Exercises.

(1) Find the domain and range of the relations whose graphs are shown bellow. Which of those graphs are graphs of functions?
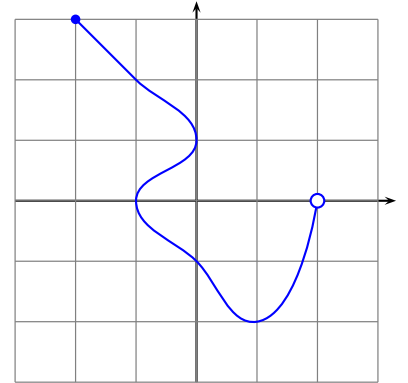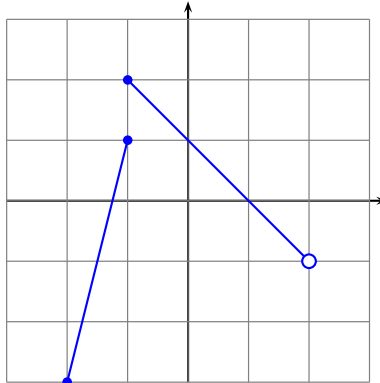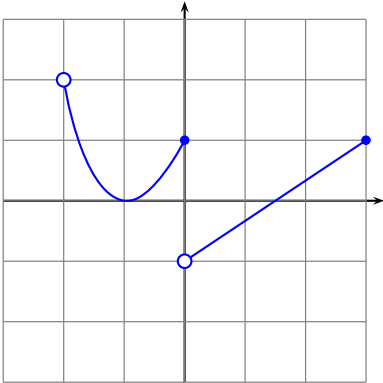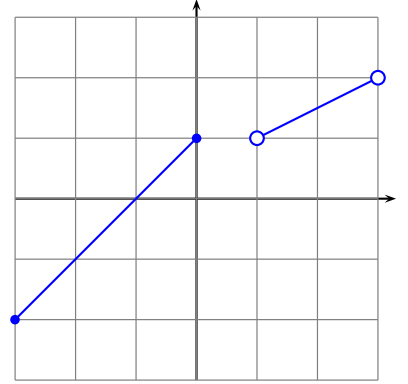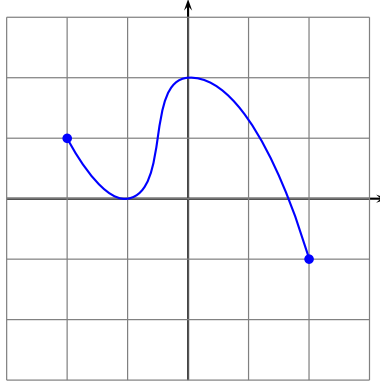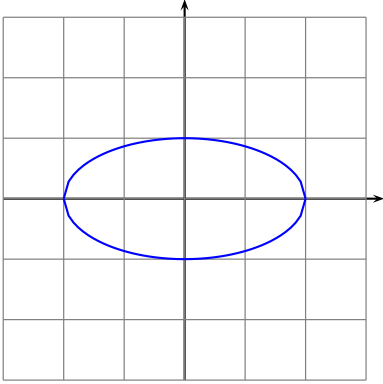

(2) Find the domain of the following functions:
   (a) $g(x) = \sqrt[3]{5x - 10}$
   (b) $f(x) = \dfrac{2x - 3}{4x + 5}$
   (c) $h(x) = \dfrac{2x}{\log_2 x}$
   (d) $g(x) = \dfrac{3}{2x - 4} + \sqrt{3x - 7}$
   (e) $f(x) = \log_3(5x - 2)$
   (f) $f(x) = \sqrt{1 - x^2}$
   (g) Extra Credit: $g(x) = \sqrt{x^2 + x - 2}$

(3) Find the range of the following functions:
   (a) $h(x) = -5x + 1$ with domain $(-2, 6]$
   (b) $f(x) = \dfrac{3}{2 - x}$
   (c) $g(x) = 3 - x^2$
   (d) $f(x) = -\sqrt{x}$
   (e) $f(x) = \sqrt{1 + x}$
   (f) $g(x) = 1 + \sqrt{x}$
   (g) $g(x) = x^3$
   (h) $f(x) = 5^x$

(i) $h(x) = \log_4 x$

(j) <u>Extra Credit:</u> $f(x) = \dfrac{2x - 1}{3x + 4}$

(k) <u>Extra Credit:</u> $g(x) = x^2 + 2px + c$ where p and c are real numbers.

(4) <u>Extra Credit:</u> Graph (using a graphical calculator or a Computer Algebra System) the following functions:

(a) $y = x^3 - x^2 - 4x + 4$

(b) $y = \cos x$

(c) $y = \sin x^2$

(d) $y = \dfrac{x}{x^2 + 1}$

(e) $y = \dfrac{x}{x^2 - 1}$

Use the graphs to determine the intervals in which the given functions are increasing or decreasing.