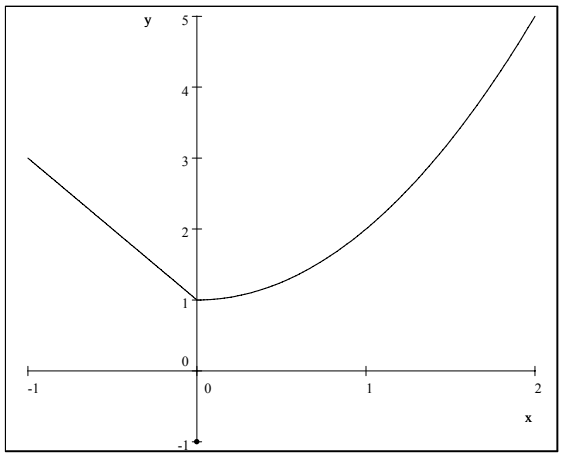
1. Describe the domain of the functions $s(x) = \sqrt{x-1}$ and $q(x) = \dfrac{1}{(x+2)(x-3)}$

   For s we must have $x - 1 \geq 0$ to take square root, so the domain of s is all $x \geq 1$. (10pts)

   For q the denominator can not be zero, so the domain of q is all $x \neq -2, 3$ (10pts)

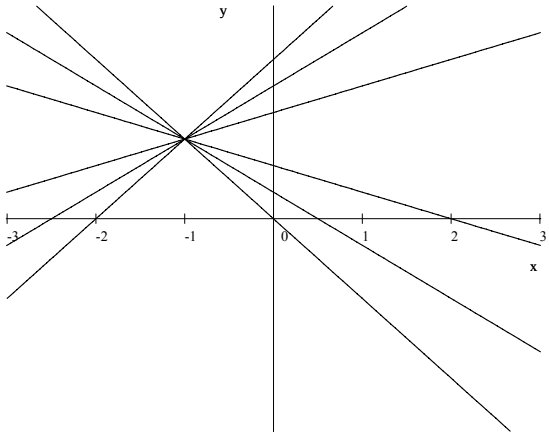
2. Let $P(x) = \begin{cases} 1 - 2x & \text{for } -1 \leq x \leq 0 \\ x^2 + 1 & \text{for } 0 \leq x \leq 2 \end{cases}$ Describe the *domain* of $P(x)$ (10pts), and draw a sketch of $y = P(x)$ below (label the axes, 15pts).

   The domain is $-1 \leq x \leq 2$ (6pts); here's a plot:

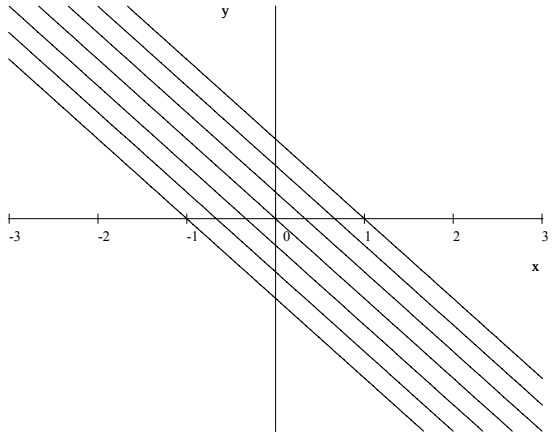


3. Let $\mathcal{F}$ be the family of all lines passing through $(-1, 3)$, and let $\mathcal{G}$ be the family of all lines of slope -3. On one set of axes below sketch some of the lines in $\mathcal{F}$ and on another set some of the lines in $\mathcal{G}$ (10 + 10 pts).

   $y = 3(x+1) + 3$



The family $\mathcal{F}$



The family $\mathcal{G}$

   (a) Write an equation describing the family $\mathcal{F}$ (15pts): Using "point-slope" equation: $y - 3 = m(x+1)$ or $y = m(x+1) + 3$; m, the slope, can be any number.

   (b) Write an equation describing the family $\mathcal{G}$ (10pts): $y = -3x + b$ where b can be any number.

   (c) What line (give equation) lies in *both* families? (10pts): $y = -3(x+1) + 3$ or $y = -3x$.