October 6, 2010   Professor Ilya Kofman
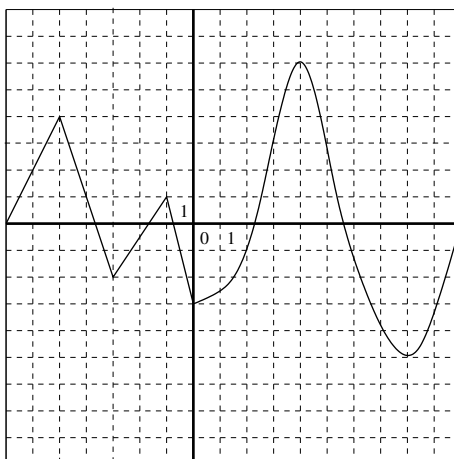
NAME: _____

1. (*20 points*)
    (a) Find the equation of the line passing through points $(1, 3)$ and $(4, 5)$. Write your final answer in the slope-intercept form $y = mx + b$.

    (b) Let $f(x) = 2x^2 - 8x + 5$. Does $f(x)$ have a maximum or minimum? Find this max or min value, and find where it occurs.

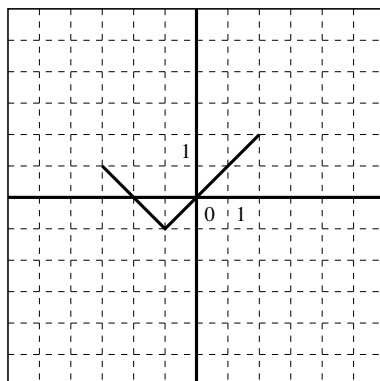**2.** (*20 points*) Let $y = f(x)$ be the graph given below.

(a) Write the values $f(-4)$, $f(2)$, $f(5)$.

(b) What are the max and min values of $f(x)$ on the domain $-4 \leq x \leq 1$?
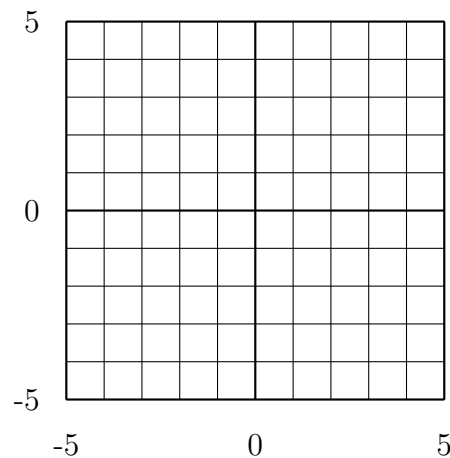
(c) On which intervals for $x \leq 0$ is $f(x)$ increasing?
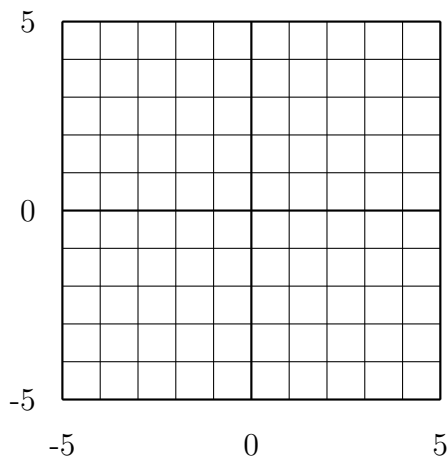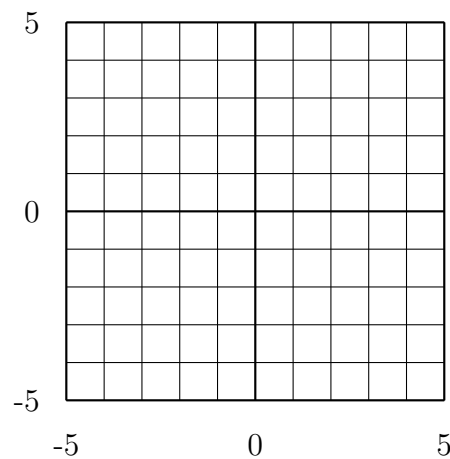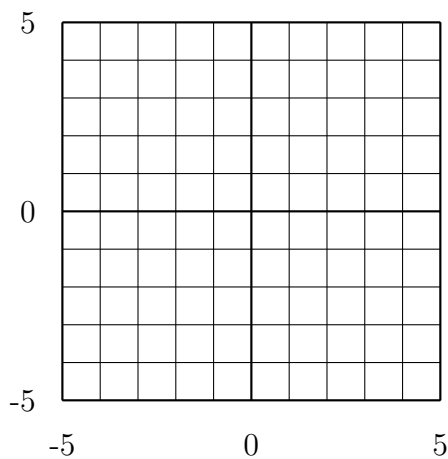
(d) Find the average rate of change of $f(x)$ on the interval $[0, 4]$.

3. (*20 points*) The graph of $y = f(x)$ is as shown.

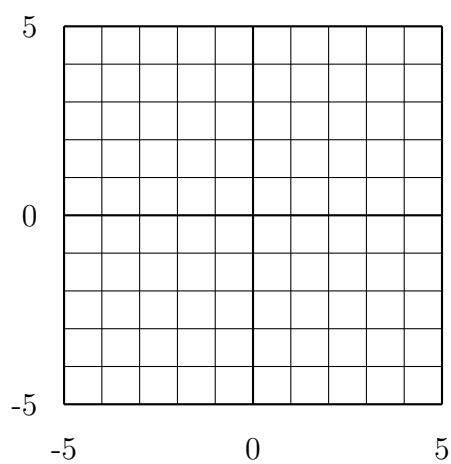Sketch the graphs of the following functions:
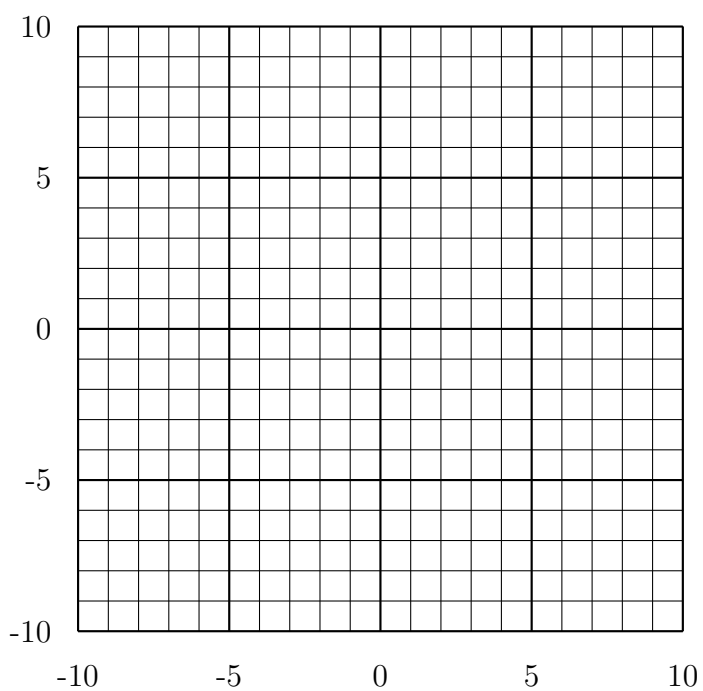(1) $y = f(x) + 2$ (2) $y = f(x + 2)$ (3) $y = -f(x)$ (4) $y = 1 - f(x)$.

4. **(a)** (*10 points*)

$$f(x) = \begin{cases} 1 + x & \text{if} & x \geq 1 \\ 2 - x & \text{if} & x < 1 \end{cases}$$

Sketch graph of $y = f(x)$.

(b) (*15 points*) Convert the function $f(x) = 3x^2 + 6x + 1$ to standard form $y = a(x - h)^2 + k$ and sketch its graph.

5. (*16 points*) Match the equations with their graphs.

(a) $2x - 3y = 6$ Graph: _____

(b) $2y + 3x = 0$ Graph: _____

(c) $y = x^2 + 3x - 2$ Graph: _____

(d) $y = 5 - x^2$ Graph: _____