

Math 123 Exam 1A

October 6, 2010

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NAME: _____

Key

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 $y = mx + b$.

$$m = \frac{\Delta y}{\Delta x} = \frac{5-3}{4-1} = \frac{2}{3}$$

$$y - 3 = \frac{2}{3}(x - 1)$$

$$y = \frac{2}{3}x + \frac{7}{3}$$

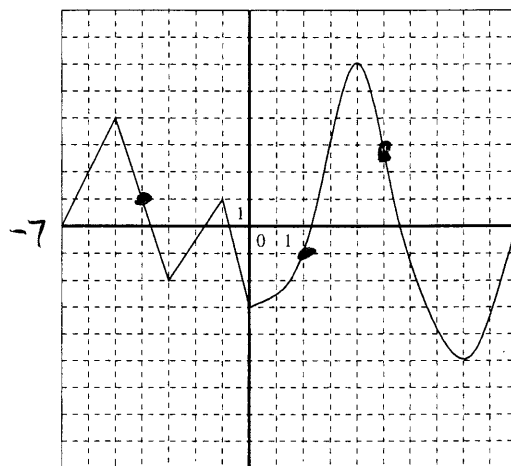
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- (b) Let $f(x) = 2x^2 - 8x + 5$. Does $f(x)$ have a maximum or minimum? Find this max or min value, and find where it occurs.

2 $f(x)$ has a minimum.4 It occurs at $x = \frac{-b}{2a} = \frac{8}{4} = 2$ 4 The minimum value is $f(2) = -3$

$$y = 2(x-2)^2 - 3$$

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



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

// // //

1 -1 3

(b) What are the max and min values of $f(x)$ on the domain $-4 \leq x \leq 1$?

max on $[-4, 1] = 1$

min on $[-4, 1] = -3$

(c) On which intervals for $x \leq 0$ is $f(x)$ increasing?

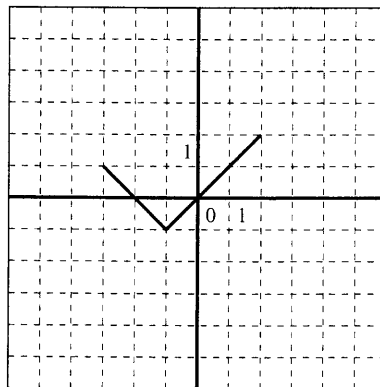
$[-7, -5]$ and $[-3, -1]$

(d) Find the average rate of change of $f(x)$ on the interval $[0, 4]$?

$$ROC = \frac{\Delta y}{\Delta x} = \frac{6 + 3}{4 - 0} = \frac{9}{4}$$

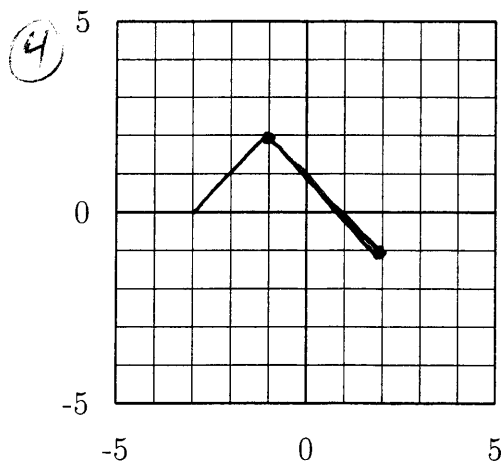
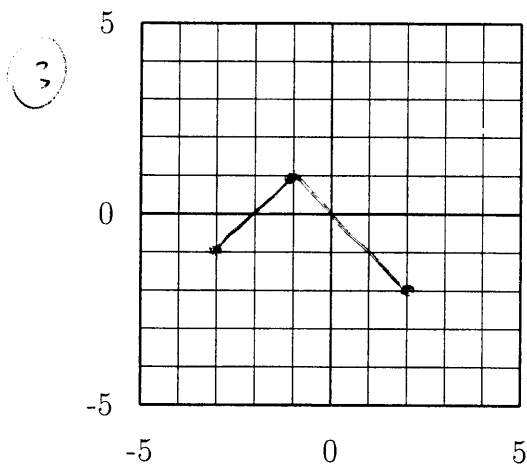
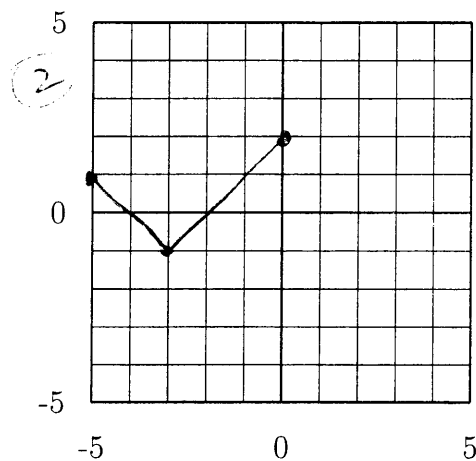
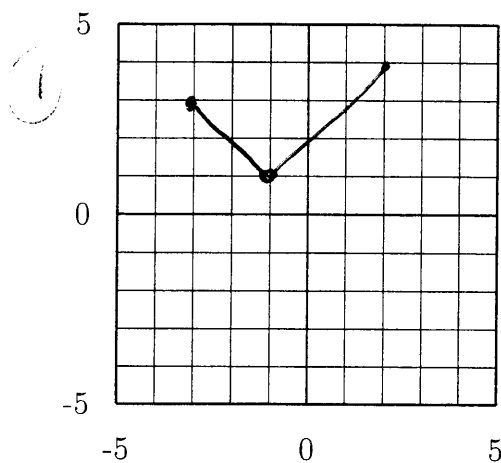
$(0, -3)$
 $(4, 6)$

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



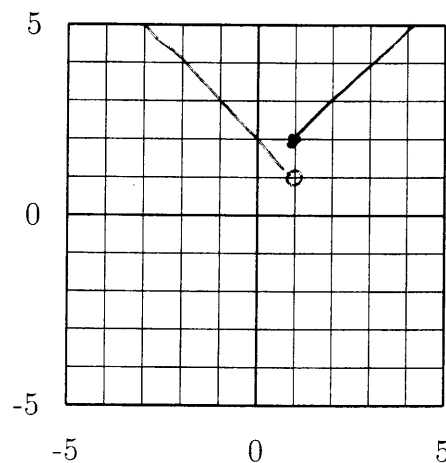
Sketch the graphs of the following functions:

- (1) $y = f(x) + 2$ (2) $y = f(x + 2)$ (3) $y = -f(x)$ (4) $y = 1 - f(x)$.



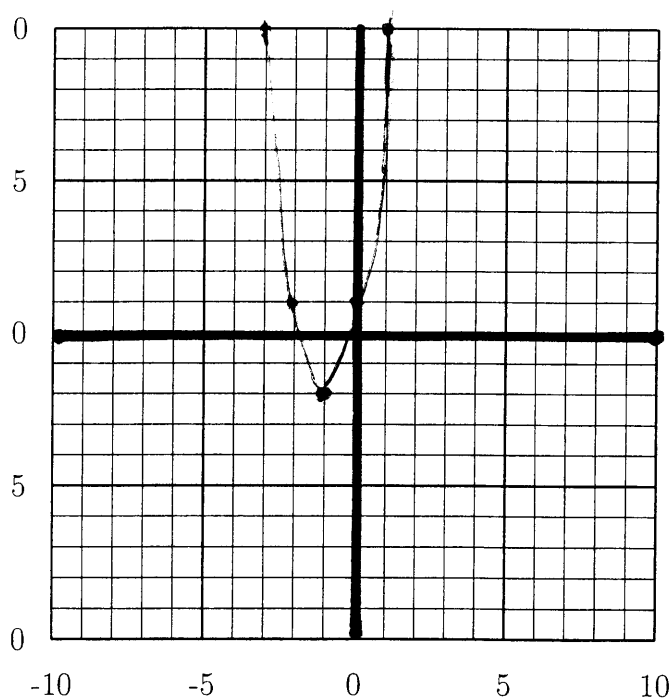
4. (a) (10 points)

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

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.

$$y = 3(x^2 + 2x + 1) + 1 - 3$$

$$y = 3(x+1)^2 - 2$$



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

(a) $2x - 3y = 6$ Graph: 5

(b) $2y + 3x = 0$ Graph: 6

(c) $y = x^2 + 3x - 2$ Graph: 1

(d) $y = 5 - x^2$ Graph: 3

