

# Sample Problems for Exam 1

College Algebra and Trigonometry, Math 123, Section 92767, Fall 2013

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- Exam 1 will be held in class on Monday Oct 7th.
  - Syllabus for Exam 1: 1.5, 1.10, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1
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1. Write down the equations of lines with the given description in the form  $y = mx + b$ .

- A line which passes through the points  $(1, 2)$  and  $(-2, 3)$ .
- A line with slope 3 and passing through the point  $(2, 2)$ .
- A line which passes through the origin and parallel to the line  $3x + 5y = 3$ .

2. Sketch the following lines after finding the  $x$  and  $y$  intercepts.

- $x + y = 3$
- $3x - 4y = 12$

3. Crisp toaster finds that the production cost for  $x$  toasters is given by the equation  $y = 6x + 30$  where  $y$  is in dollars.

- What is the cost of producing 50 toasters ?
- What do the slope and  $y$ -intercept represent.

4. Let

$$f(x) = \begin{cases} 3x & \text{if } x < 0 \\ 1 - x & \text{if } 0 \leq x \leq 4 \\ x + 1 & \text{if } x > 4 \end{cases}$$

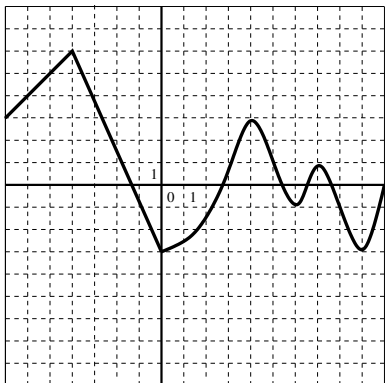
- Evaluate  $f(-2), f(0), f(2), f(4), f(6), f(8)$ .
- Sketch the graph of  $y = f(x)$ .
- Find the intervals on which  $f(x)$  is increasing or decreasing.

5. Let  $f(x) = x^2 + 1$ . Find  $f(2), f(a), f(a + 1)$ .

6. Find the domain of the following functions.

- $g(x) = \sqrt{3x - 4}$
- $h(x) = \frac{x+1}{3-x}$
- $f(x) = \frac{x^2}{\sqrt{x+4}}$

7. Let  $y = f(x)$  be the graph given below.



- What is the domain of  $f$  ?
- What is the range of  $f$  ?
- Write the values  $f(-7), f(-5), f(0), f(3), f(4)$  and  $f(7)$ .
- What is the average ROC for  $[0, 4], [-4, 4]$  and  $[4, 8]$ ?

8. Sketch a graph of a function which is decreasing on the interval  $x < -4$ , increasing in the interval  $-4 < x < 2$  and decreasing on the interval  $x > 2$ .
9. The table shows the number of CD players sold in the store ElectricRUs in the years 2004 to 2010:

Year	2004	2005	2006	2007	2008	2009	2010
Units sold	512	520	410	375	244	205	175

- (a) What was the average rate of change of sales between 2004 and 2007 ?
- (b) What was the average rate of change of sales between 2006 and 2010 ?
- (c) What was the average rate of change of sales between 2004 and 2010 ?
10. Problems from Section 2.5, pp.188-190, Problems 55–66, 83–84, 86.
11. For the given quadratic function, determine if it has an absolute maximum or minimum and find it. Also find the vertex and axis of symmetry. Use this information to sketch its graph.
- (a)  $f(x) = 2x^2 - 10x + 14$       (b)  $f(x) = x^2 - 5x + 6$       (c)  $f(x) = -2x^2 + 2x + 1$
12. Complete the square and put the quadratic function in the standard form  $f(x) = a(x - h)^2 + k$ . Use this and transformations to sketch the graph of  $y = f(x)$ .
- (a)  $f(x) = 2x^2 + 8x + 6$       (b)  $f(x) = x^2 - 6x + 5$