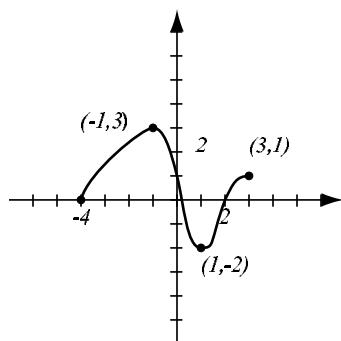


1. (8pts) Use the graph of the function  $f$ , below, to answer the following questions.

- What is  $f(-1)$ ?
- What are the  $x$ -intercepts?
- Where is the function increasing?
- Where does  $f$  have a local minimum? What is its value?
- How many solutions does the equation  $f(x) = 0.5$  have?



2. (7pts) The quadratic function  $f(x) = -x^2 + x + 2$  is given. Do the following without using the calculator.

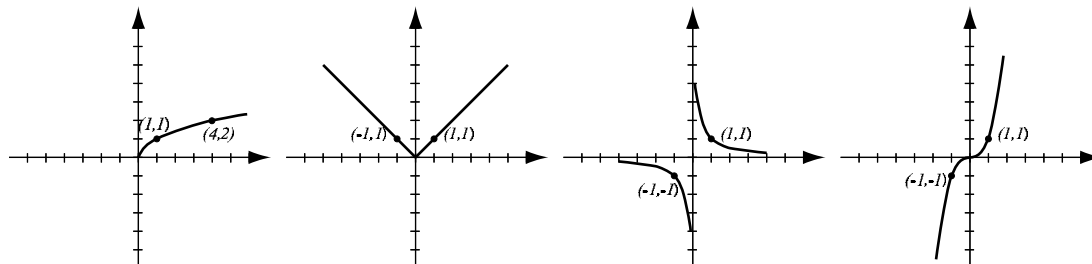
- Find the  $x$ -intercepts of its graph, if any.
- Find the vertex of the graph.
- Sketch the graph of the function.
- What is the range of the function?

3. (4pts) Determine algebraically whether the graph of  $y = x^4 - 3x^2 + 2$  is symmetric about the  $x$ -axis,  $y$ -axis or the origin. Then draw the graph of the equation on the test and verify your answer.

4. (5pts) The price  $P$  a customer pays for apples at the local grocery store is directly proportional to the number  $x$  of pounds that they buy. Suppose one customer paid \$2.37 for 3lbs of apples.

- Find the linear function that relates the price to the amount bought.
- You bought 1.5lbs of apples. How much did you pay?

5. (4pts) The following are graphs of basic functions. Write the equation of the graph under each one.



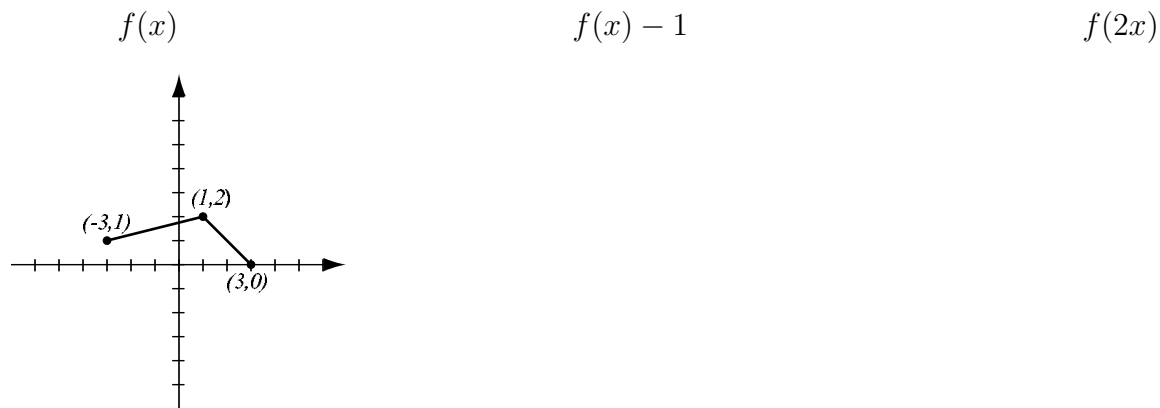
**6.** (6pts) Consider the function  $f(x) = 0.2x^3 + 0.6x^2 - 4x + 6$ . Answer the numerical questions with accuracy to two decimal places.

a) Draw the graph of the function on the test.

b) Find the numbers  $x$  (if any) where  $f$  has a local minimum or maximum. Find the value of the function at those numbers.

c) Determine the intervals where the function is increasing and where it is decreasing.

**7.** (5pts) The graph of  $f(x)$  is drawn below. Find the graphs of the other two functions and label all the relevant points.



**8.** (4pts) Sketch the graph of the function  $f(x) = -\sqrt{x+3}$  using the graph of a basic function. Explain how the basic graph is to be transformed in order to get the graph of  $f$ . Label at least two points on each graph.

9. (7pts) Farmer Eddie has 2000m of fencing that he wants to use to enclose a rectangular plot bordering a straight river. If the side of the rectangle along the river is not fenced, what is the largest area that can be enclosed?

**Bonus** (5pts) Sketch the graph of the function given by

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

What is  $f(1)$ ?