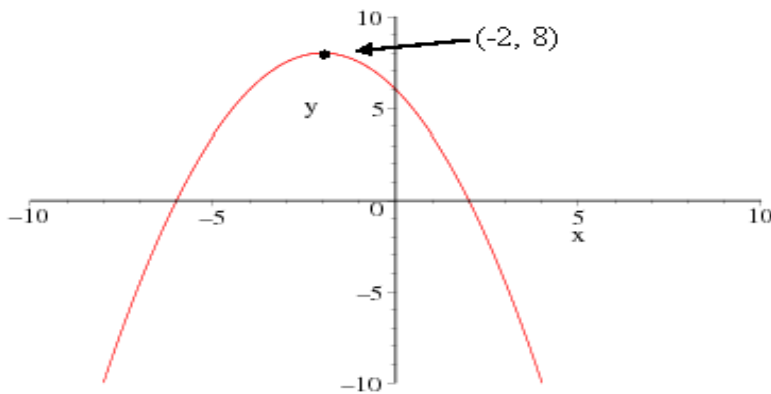


Group #: \_\_\_\_\_ Name: \_\_\_\_\_

1. (52 points) Answer the following questions for the quadratic function (a)  $f(x) = 2x^2 - 20x + 57$  and (b)  $f(x) = -x^2 + x + 2$ .
  - (a) (9 points) Convert  $f(x)$  into its standard form (by completing the square). What is its vertex?
  - (b) (4 points) Find the  $x$ -intercepts of  $f$ , if any.
  - (c) (4 points) Find the  $y$ -intercepts of  $f$ , if any.
  - (d) (5 points) Sketch the graph of  $f$ .
  - (e) (4 points) Complete the sentence: The function  $f$  has a (circle one) maximum/minimum at \_\_\_\_\_. This graph opens (circle one) upward/downward.
  
2. (12 points) The graph of the quadratic function  $g(x)$  is shown here. Find a formula for  $g(x)$ .



3. (12 points) Find all real solutions of the equation

$$1 + \frac{2x}{(x+3)(x+4)} = \frac{2}{x+3} + \frac{4}{x+4}.$$

4. (12 points) Find a function whose graph is a parabola with vertex  $(1, -2)$  and passes through the point  $(4, 16)$ .
5. (12 points) A soft-drink vendor at a popular beach analyzes his sales records and finds that if he sells  $x$  cans of soda pop in one day, his profit (in dollars) is given by

$$P(x) = -0.001x^2 + 3x - 1800.$$

What is his maximum profit per day and how many cans must he sell for maximum profit? Write your answer in complete sentences.