

**Math 06, Homework 4 on Sections 8.3, 8.4**  
**due Mon, Sept 30 at the start of class.**

---

Write all your answers on a separate sheet. These first eight questions are 1 point each. It is very important that you show clearly any work you had to do to get the answer. Check your answers match the solutions on page 2.

(1) Find the point symmetric to  $(6, 5)$  through the axis of symmetry  $x = 4$ .

(2) Find the vertex of:

$$f(x) = -x^2 - 2x$$

(3) Find the axis of symmetry, vertex y-intercept and x-intercepts of:

$$f(x) = x^2 - 6x + 8$$

(4) Find the axis of symmetry and vertex of:

$$f(x) = 3x^2 + 12x + 5$$

(5) A company's weekly dollar profit  $P$  is related to the number  $x$  of items sold by

$$P(x) = -0.3x^2 + 60x - 400.$$

Find the number of items that should be sold each week to maximize the profit. Then find the amount of that profit.

(6) Solve and simplify the solutions:  $x^4 - 14x^2 + 45 = 0$

(7) Find the solution set for the equation:  $x^4 + x^2 - 20 = 0$

(8) Find the solution set for the equation:  $x - 8\sqrt{x} + 15 = 0$

---

These next seven questions are 4 points each. Show clearly all your working out and reasoning.

(9) The graph of  $y = -2x^2 + 2x + 10$  is similar in shape to which of these letters?

**C, X, u, n**

(10) Find the axis of symmetry of this graph:  $y = x^2 - 4x + 1$

(11) Graph the parabola  $y = x^2 - 4x + 3$  and indicate on your graph the axis of symmetry, the vertex and the y-intercept.

(12) How many  $x$ -intercepts does the parabola  $y = 2x^2 + x + 1$  have?

(13) Find the solution set for the equation:  $x^4 - 5x^2 + 6 = 0$

(14) Find the solution set for the equation:  $x - 6\sqrt{x} - 16 = 0$

(15) If the height  $h$  in feet of a ball  $t$  seconds after being thrown is

$$h = -16t^2 + 64t,$$

find the maximum height the ball will attain.

---

**Answers to questions (1)-(8):**

(1)  $(2, 5)$

(2) The vertex is at  $(-1, 1)$

(3) The axis of symmetry is the vertical line  $x = 3$ . The vertex is at  $(3, -1)$ . The  $y$ -intercept is at  $(0, 8)$ . The two  $x$ -intercepts are at 2 and 4 on the  $x$ -axis.

(4) The axis of symmetry is the vertical line  $x = -2$ . The vertex is at  $(-2, -7)$ .

(5) The number of items that should be sold each week to maximize the profit is 100. The corresponding profit is \$2600.

(6) The solutions are  $x = \sqrt{5}, -\sqrt{5}, 3$  or  $-3$ .

(7) The solution set is:  $\{2, -2, \sqrt{5}i, -\sqrt{5}i\}$

(8) The solution set is:  $\{9, 25\}$