

**Homework 5**

1. (Mad Hatter 9-10 2005) Solve for  $x$ :  $\sqrt{1 + \sqrt{2 + \sqrt{x}}} = 3$ .
2. (Mad Hatter 9-10 2005) Solve for  $x$ :  $4^x - 4^{x-1} = 12$ .
3. (Mad Hatter 11-12 1997) Find all solutions of  $2 \cos^2(x) + 3 \cos x = -1$  in the interval  $[0, 2\pi)$ .
4. (Mad Hatter 11-12 1997) What is the minimum value of  $f(x) = 2x^2 - 4x - 1$ ?
5. (Leap Frog 9-12 1998) Let  $f(x) = -x^2 + (a+1)x + a^2$ . Find the value of  $a$  for which the maximum value of  $f(x)$  is as small as possible. For this value of  $a$ , graph  $f(x)$  and find its maximum value.