

## COSC 311/317 — Fall 2014

### Homework 4 — Due Sept. 19

1. What are Polya's steps in problem solving? Name them and describe each in a sentence or two.

For each of the following, you are to prove the theorem, but show how you have developed your proof by the naming the methods (Forward-Backward, Construction, Choose, Specialization)<sup>1</sup> that you are using and labeling the steps A1, A2, ..., B1, B2, ... as we have done in class. *You will not receive full credit if you do not identify the methods and label the steps!*

2. The equation  $x^2 - 5x/2 + 3/2 = 0$  has a real solution.
3. If  $a$ ,  $b$ , and  $c$  are real numbers with  $a \geq 0$ , then the function  $f(x) = ax^2 + bx + c$  satisfies the property that for all real numbers  $x$  and  $y$ ,  $f(x) \geq f(y) + (2ay + b)(x - y)$ .

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<sup>1</sup>For a review, see the file "Summary of proof techniques from Solow" on the course website.