

Name (Last, First): _____

Student ID: _____

Dror Bar-Natan: Classes: 2015-16: MAT 475 Problem Solving Seminar:

<http://drorbn.net/16-475>

Quiz 7 on March 10, 2016: “Divide into Cases”. You have 30 minutes to solve as much as you can of the following two problems. Please write on both sides of the page. **Good Luck!**

Problem 1 (Larson’s 1.7.8). Determine $F(x)$, if for all real x and y , $F(x)F(y) - F(xy) = x + y$.

Problem 2 (Larson’s 2.5.11a). Let R_n denote the number of ways of placing n nonattacking rooks on an $n \times n$ chessboard so that the resulting arrangement is symmetric about a 90° clockwise rotation of the board about its centre. Show that if k is a natural number, then $R_{4k} = (4k - 2)R_{4k-4}$, and $R_{4k+1} = R_{4k}$, and $R_{4k+2} = R_{4k+3} = 0$.