

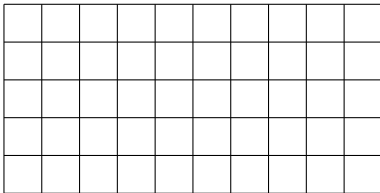
HOMWORK 0

MAT160: Mathematical problems and games.
Spring 2005

01/25/2005

1. The *burning rope* problem. Suppose that you have two (different) pieces of rope and a lighter. You can light the ropes from either side and they burn in exactly one hour. By burning the ropes, how do you measure 45 minutes?

2. How many rectangles are in the following figure? How many squares?



3. Prove that $\sqrt{2}$ is not a rational number.

4. If $SAGE + SUAVE + SAGE = 46933$, what word will correspond to the number 46933? Each number is represented with at most one letter.

5. Solve the following equations

$$x^4 - 2x^2 + 2 = 0 \tag{1}$$

$$x^4 + x^3 + x^2 + x + 1 = 0 \tag{2}$$