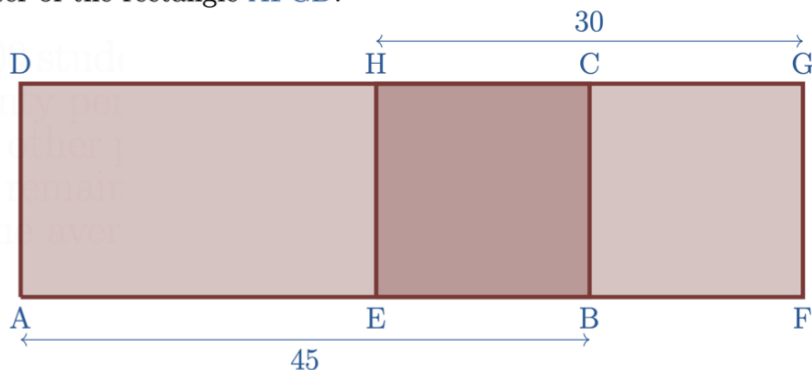# NMSU MATH PROBLEM OF THE WEEK

Solution to Problem 2

Spring 2022

Problem 2

If the intersection of the rectangle ABCD and EFGH is a square, then find the perimeter of the rectangle AFGD.

Solution. Although we do not know the width of the rectangle ABCD and EFGH, the diagram suggests they are equal, call it α. Then each side of the square EBCH equals α. Therefore,

$$|BF| = |EF| - |EB| = |HG| - |HC| = 30 - \alpha$$

$$|DH| = |DC| - |HC| = |AB| - |EB| = 45 - \alpha$$

and

$$
\begin{aligned}
\text{perimeter of AFGD} &= |AB| + |BF| + |FG| + |GH| + |HD| + |DA| \\
&= 45 + (30 - \alpha) + \alpha + 30 + (45 - \alpha) + \alpha \\
&= 150.
\end{aligned}
$$

Note that the value of α cannot be determined. However, we can calculate the perimeter of AFGD because it is independent of α.