**Lesson Problem Statement Answer Key**

**Lesson problem statement:** Your objective is to place some pencils in a tray such that they are stable. This means that you must align the long axes of the pencils with the groove in the tray. You know that a golf pencil (x) is 3.5-inches long and a regular pencil (y) is 7.5-inches long. The tray has room for no more than 52.5 linear inches of pencils (the groove is 52.5 inches long). **Question:** How many of each pencil should you use in order to maximize the total number of pencils in the tray?

TeachEngineering.org – Free STEM Curriculum for K-12

1. Inequalities to graph are:

**x ≥ 0**

**y ≥ 0**

**y ≤ - x + 7**

1. The corner points of the shaded region are:

**(0,0)**

**(15,0)**

**(0,7)**

1. The optimization equation is:

**z = x + y**

1. The values of the optimization equation at each corner point are:

**z(0,0) = 0 + 0 = 0**

**z(15,0) = 15 + 0 = 15**

**z(0,7) = 0 + 7 = 7**

1. The maximum value is:

**z(15,0) = 15**

1. The final solution is:

**15 golf pencils and 0 regular pencils**