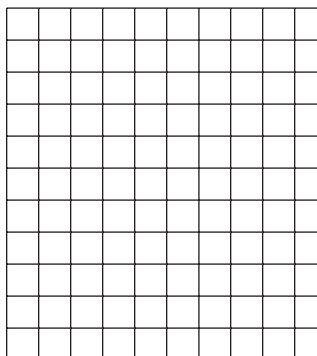


## Enrichment 3-4

### Shipping It Out

The Supreme Shipping Company can load its trucks with both rectangular and cylindrical containers. A rectangular container has a volume of 100 cubic ft and weighs 200 lb. A cylindrical container has a volume of 200 cubic ft and weighs 100 lb. Let  $x$  denote the number of rectangular containers carried by a truck, and let  $y$  denote the number of cylindrical containers.

1. What constraint must be satisfied if each truck has room for at most 4200 cubic ft of containers?
2. What constraint must be satisfied if each truck can carry a maximum of 4800 lb?
3. What additional constraints must be satisfied because the problem involves real objects?
4. Graph the feasibility set on the grid and label its vertices. Call the vertex on the  $x$ -axis  $A$ , the vertex on the  $y$ -axis  $B$ , and the vertex on neither axis  $C$ . Label the origin  $O$ .



5. Suppose that Supreme Shipping charges \$60 to ship either a rectangular or a cylindrical container and wishes to maximize its income.
  - a. What is the objective function?
  - b. What is the value of the objective function at vertex  $A$ ?
  - c. At vertex  $B$ ?
  - d. At vertex  $C$ ?
  - e. What combination of containers should Supreme Shipping use to maximize its income?

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