Answer Key
Linear Programming Practice Problems Worksheet

Problem 1: A storage solutions company manufactures large and small file folder cabinets. Large cabinets require 50 pounds of metal to fabricate and small cabinets require 30 pounds, but the company has only 450 pounds of metal on hand. If the company can sell each large cabinet for $70 and each small cabinet for $58, how many of each cabinet should it manufacture in order to maximize income?

1. Inequalities to graph are:

    $x \geq 0$

    $y \geq 0$

    $50x + 30y \leq 450$

2. The corner points of the shaded region are:

    (0,0)

    (0, 15)

    (9,0)

3. The optimization equation is: **$z = 70x + 58y$**

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

    $z(0,0) = 0 + 0 = 0$

    $z(0,15) = 0 + 58*15 = 870$

    $z(9,0) = 70*9 + 0 = 630$

5. The maximum value is: **$z(0,15) = 870$**

6. The final solution is: **15 small cabinets and 0 large cabinets**

Problem 2: You are a civil engineer designing a bridge. The walkway needs to be made of wooden planks. You are able to use either Sitka spruce planks (which weigh 3 pounds each), basswood planks (which weigh 4 pounds each), or a combination of both. The total weight of the planks must be between 600 and 900 pounds in order to meet safety code. If Sitka spruce planks cost $3.25 each and basswood planks cost $3.75 each, how many of each plank should you use to minimize cost while still meeting building code?

1. Inequalities to graph are:

    $x \geq 0$

    $y \geq 0$

    $3x + 4y \geq 600$

    $3x + 4y \leq 900$

2. The corner points of the shaded region are:

    (200,0)

    (0,150)

    (300,0)

    (0,225)

3. The optimization equation is: **$z = 3.25x + 3.75y$**

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

    $z(200,0) = 3.25*200 + 0 = 650$

    $z(0,150) = 0 + 3.75*150 = 562.50$

    $z(300,0) = 3.25*300 + 0 = 975$

    $z(0,225) = 0 + 3.75*225 = 843.75$

5. The minimum value is: **$z(0,150) = 562.50$**

6. The final solution is: **0 Sitka spruce planks and 150 basswood planks**