

5.5 PROJECT

MAXIMIZING PROFITS ON JEWELRY SALES

Eve likes to create jewelry as a hobby and has decided to open an Etsy shop to sell some of her creations in hopes of making some extra money. On average, it costs Eve \$9 to make a necklace and \$6 to make a pair of earrings. She wants to earn a profit (before taxes and fees) of \$11 on each necklace sold and \$8 on each pair of earrings sold. Eve has a starting budget of \$180 and doesn't want to open her Etsy shop with more than 15 of either type of jewelry. Eve's goal with the Etsy shop is to maximize her potential profit. In this project, you will help Eve determine how many necklaces and how many pairs of earrings she should create to set up her Etsy shop.

Let x represent the number of necklaces and y represent the number of pairs of earrings.

1. What is the objective function for this situation? Explain what the function represents.
2. Describe the constraints of the situation and write a linear inequality to represent each one.
3. Graph the constraints from part 2.
4. What are the vertices of the feasible region?
5. Find the maximum of the objective function. Explain what this result means. Does the value make sense? Explain why or why not.
6. Suppose Eve decided to not limit herself to 15 of each type of jewelry. Would this change the initial setup of her Etsy shop? Explain why or why not.