



Profitable Pictures

Hassan asked his friend Sharma for advice about what combination of pictures to make. She suggested that he determine a reasonable profit for that month's work and then paint what he needs in order to earn that amount of profit.

Here are the facts you need from *Homework 7: Picturing Pictures*.

- Each pastel requires \$5 in materials and earns a profit of \$40 for Hassan.
- Each watercolor requires \$15 in materials and earns a profit of \$100 for Hassan.
- Hassan has \$180 to spend on materials.
- Hassan can make at most 16 pictures.

See if you can help Hassan and Sharma. Turn in a written report on the situation. This report should include your work on Questions 1 through 4, but the most important part is your explanation on Question 5.

1. You have already found the feasible region for the problem, which is the set of points that satisfy the constraints. On graph paper, make a copy of this feasible region to use in this problem. Label your axes and show the scales.
2. Suppose Hassan decided \$1,000 would be a reasonable profit.
 - a. Find three different combinations of watercolors and pastels that would earn Hassan a profit of exactly \$1,000.
 - b. Mark these three number pairs on your graph from Question 1.

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3. Now suppose Hassan wanted to earn only \$500 in profit. Find three different combinations of watercolors and pastels that will earn Hassan a profit of exactly \$500. *Using a different-colored pencil*, add those points to your graph.
4. Now suppose that Hassan wanted to earn \$600 in profit. Find three different combinations of watercolors and pastels that will earn Hassan a profit of exactly \$600. *Using a different-colored pencil*, add those points to your graph.
5. Well, Hassan's mother has convinced him that he should try to earn as much as possible. So Hassan needs to figure out the most profit he can earn within his constraints. He also wants to be able to prove to his mother that it is really the maximum amount.
 - a. Find the maximum possible profit that Hassan can earn and the combination of pictures he should make to earn that profit.
 - b. Write an explanation that would convince Hassan's mother that your answer is correct.