

Profitable Pictures



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

Here are the facts about Hassan's paintings.

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

See if you can help Hassan and Sharma. Prepare a written report on the situation. This report should include your work on Questions 1 to 4. Most importantly, it should contain your explanation for Question 5.

1. You have already found the feasible region for the problem. Remember, the feasible region is the set of points that satisfy the constraints. On graph paper, copy this feasible region to use in this activity. Label the axes and show the scales.

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2. Suppose Hassan decides that \$1,000 would be a reasonable profit.
 - a. Find three combinations of watercolors and pastels that would earn Hassan a profit of exactly \$1,000.
 - b. Mark these three number pairs on your graph.
3. Now suppose Hassan wants to earn only \$500 in profit. Find three combinations of watercolors and pastels that will earn a profit of exactly \$500. Using a different color, add these points to your graph.
4. Now suppose Hassan wants to earn \$600 in profit. Find three combinations of watercolors and pastels that will earn a profit of exactly \$600. Using a third color, add these points to your graph.
5. Hassan's mother has convinced him that he should try to earn as much as possible. Hassan wants to figure out the highest profit he can make within his constraints. He also wants to prove to his mother that this profit really is the maximum amount.
 - a. Find the maximum possible profit that Hassan can earn and the combination of pictures he needs to paint to earn that profit.
 - b. Write an explanation that will convince Hassan's mother that your answer is correct.