Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Advanced Functions and Modeling Unit 3 Graded Assignment**

A store manager has room on her shelves for no more than a total of 100 items of Brand X and Brand Y. From experience, she knows she will need at least 30 items of Brand X and not more than 50 items of Brand Y. Her profit is twenty cents for each item of Brand X and twenty-five cents for each item of Brand Y. If she can sell her entire stock, how many of each brand should there be to yield maximum profit?

1. Define the variables. Use a complete sentence.

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2. Write the profit equation. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Write the constraints.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Graph the constraints. 5. State the corner points and determine the x- and y-Label the x- and y-axes. profit at each vertex.

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| --- | --- |
| **Corner Points** | **Profit** |
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6. How many of each brand should there be to yield a maximum profit? Write your answer as a complete sentence.

Delores arrives at school late because her car broke down, and therefore, has only 45 minutes to complete a history exam. The exam has 2 open-ended questions and 30 multiple-choice questions. Each correct open-ended question is worth 20 points, and each multiple-choice question is worth 2 points. She knows that it usually takes her 15 minutes to answer an open-ended question and only one minute to answer a multiple-choice question. Assume that for each question Delores answers, she receives full credit. How many of each type of question should she answer to receive the maximum possible points? What is the maximum possible points that Delores can receive?

7. Define the variables. Use a complete sentence.

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8. Write the optimization equation. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Write the constraints.

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. Graph the constraints. 11. State the corner points and determine the

Label the x- and y-axes. score at each vertex.

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| --- | --- |
| **Corner Points** | **Score** |
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12. How many of each type should she answer to maximize her score? Write your answer as a complete sentence.