

<p><b>Task Model 5</b></p> <p><b>DOK Levels 3, 4</b></p> <p><b>Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.</b></p> <p><b>Target E</b></p>	<p><b>Task Expectations:</b> Focus on developing a mathematical model of a real phenomenon. Any of the following scenarios can be used to assess this target.</p> <ul style="list-style-type: none"> <li>Given a situation, the student will identify or create a symbolic or graphical model to represent the situation (includes equations, diagrams, and graphs).</li> <li>Given data (table of values, scatterplot, etc.) the student will identify the type of function that might best model the situation.</li> <li>The student will assess the fit of a particular model being used, including models used in two and three-dimensional geometry.</li> <li>May use a simulation that mirrors the functioning of a formula-based online calculator.</li> </ul> <p><b>Example Item 1 (Grade 8):</b>          Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.B)          (Source: Adapted from Illustrative Mathematics 8-F Modeling with a Linear Function)</p> <p>Select <b>all</b> situations that can be modeled by the linear equation <math>y = 2x+5</math>.</p> <ol style="list-style-type: none"> <li>There are initially 5 rabbits on the farm. Each month thereafter the number of rabbits is 2 times the number in the month before. How many rabbits are there after <math>x</math> months?</li> <li>Joe earns \$2 for each magazine sale. He also earns \$5 for each hour he spends trying to sell magazines. How much money will he earn after selling magazines for <math>x</math> hours?</li> <li>Sandy charges \$2 an hour for babysitting. Parents are charged \$5 if they arrive home later than scheduled. Assuming the parents arrived late, how much money does she earn for <math>x</math> hours?</li> <li>Sneak Preview is a members-only video rental store. There is a \$2 initiation fee and a \$5 per video rental fee. How much would Laney owe on her first visit if she becomes a member and rents <math>x</math> videos?</li> <li>Andre is saving money for a new CD player. He began saving with a \$5 gift and will continue to save \$2 each week. How much money will he have saved at the end of <math>x</math> weeks?</li> </ol> <p><b>Rubric:</b> (1 point) The student identifies all situations modeled by the equation (e.g., C and E).</p> <p><b>Response Type:</b> Multiple Choice, multiple correct response</p>
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**Task Model 5**

**DOK Levels 3, 4**

**Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.**

**Target E**

**Example Item 2 (Grade 8):**  
 Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.5)

The table shows the relationship between the average number of hours students study for a mathematics test and their average grade.

Hours Studying	Average Grade
0	62
1	78
2	85
5	74

Which type of function is most likely to model these data?

- A. linear function with positive slope
- B. linear function with negative slope
- C. non-linear function that decreases then increases
- D. non-linear function that increases then decreases

**Rubric:** (1 point) The student recognized the function most likely to model the data (e.g., D).

**Response Type:** Multiple Choice, single correct response