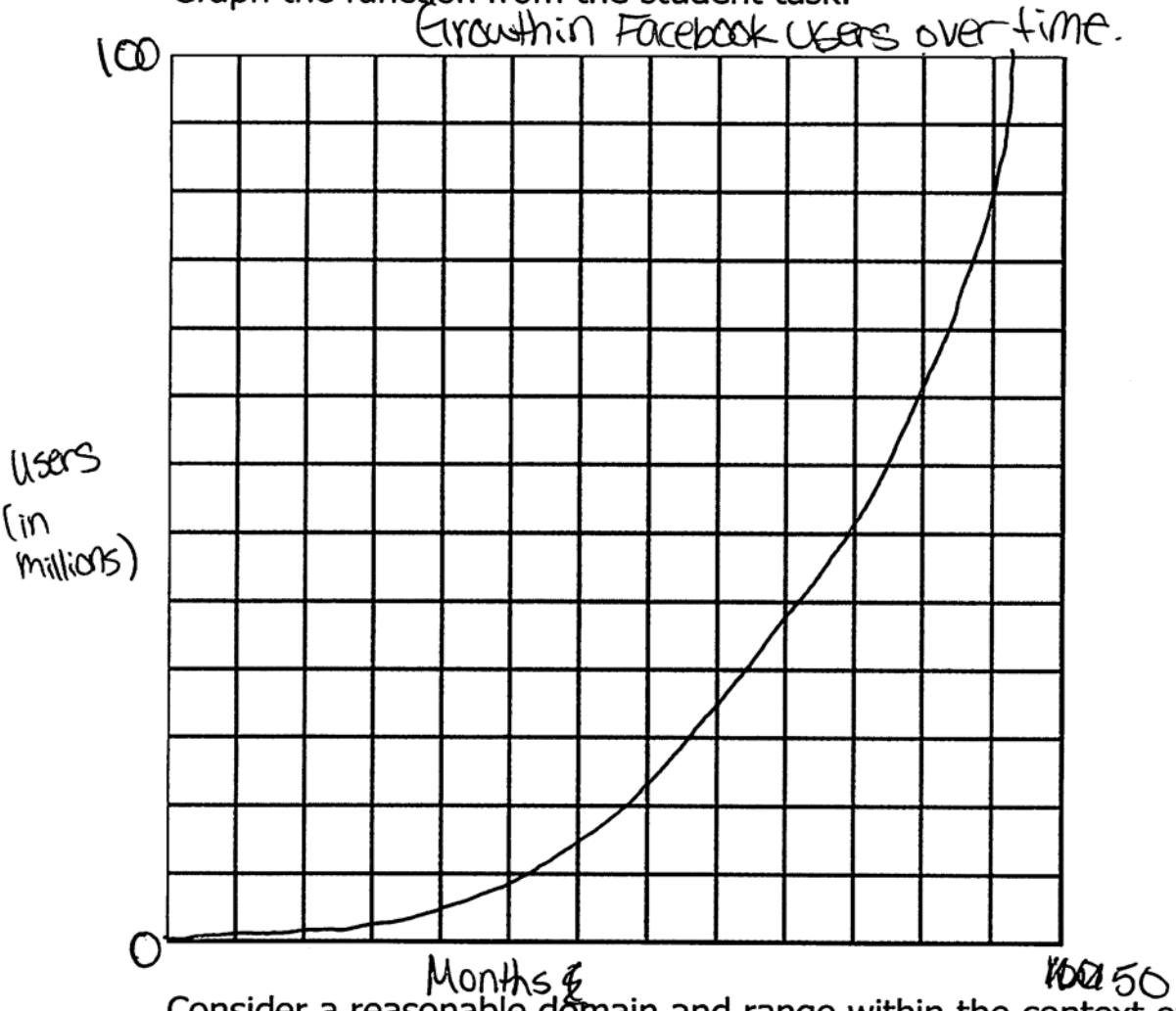
Mathematics 30-1
Performance Assessment: First Steps

Facebook Users

Sample 3

Name _____

Graph the function from the student task.



Consider a reasonable domain and range within the context of this situation. Does the graph fit within this domain and range?

Next Steps

- Use the equation to predict what the total number of Facebook users should have been in August of 2012.
- Discuss whether that is a reasonable prediction.
- Use your equation to determine when the population should have hit 1 billion users.

Criterion 2, Part 1
Excellent

Criterion 1 - Adequate
Domain and range below with graph above

1. Use the equation to predict... August 2012.
$u = 1.38(1.1)^{9692}$
$u = 8.872$ billion 8872 million 8.872 billion.
D: $x \in R$ R: $y \geq 0$

2. That is unreasonable because our planet only has 7 billion people living on it, and the prediction exceeds the total population of earth.

Criterion 2, Part 2
Excellent

3. Predict:
The exponential graph shows that facebook would hit 1 billion users at 69.1 months after December 2004, or 5.8 years after it's creation.

Criterion 3 - Adequate

Verify:

$$\frac{1000}{1.38} = \frac{1.38(1.1)^x}{1.38}$$

$$\frac{\log \frac{1000}{1.38}}{\log 1.1} = \frac{x \log 1.1}{\log 1.1}$$

$x = 69.097$ months
(rounded up)
$= 69.1$

Mathematics 30-1
Performance Assessment: Rubric

Facebook Users

Student Sample 3 **Date** _____

Level / Criteria	4 **Excellent**	3 **Proficient**	2 **Adequate**	1 **Limited ***	**Insufficient/ Blank ***
Graph an exponential function (Relations and Functions 9) [C, CN, T, V]	Draws an accurate graph and provides an **in-depth** description of the domain and range.	Draws an accurate graph and provides a **sufficient** description of the domain and range.	Draws an accurate graph and provides a **partial** description of the domain and range. The graph is accurate, though sparsely labeled. The student writes down the domain and range, but makes no link to the context of this problem.	Draws an **inaccurate** graph and provides a **flawed** description of the domain and range.	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Calculate the number of users (Relations and Functions 10) [C, CN, PS, R]	Applies the given function **correctly** to determine the number of users. The student has determined 92 months, and used the value correctly. Provides a **perceptive** discussion of the reasonableness of the answer. The student has considered the total population of the world.	Applies the given function in a **substantially correct** manner to determine the number of users. Provides a **thoughtful** discussion of the reasonableness of the answer.	Applies the given function in a **partially correct** manner to determine the number of users. Provides a **simplistic** discussion of the reasonableness of the answer.	**Unable** apply the given function to determine the number of users.	

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Solve exponential equation graphically and algebraically (Relations and Functions 7 and 8) [C, CN, ME, R, T]	Algebraically manipulates the exponential equation **correctly** to verify the graphical prediction.	Algebraically manipulates the exponential equation in a **substantially correct** manner to verify the graphical prediction.	Algebraically manipulates the exponential equation in a **partially correct** manner to verify the graphical prediction. The graphical solution the student provides is not shown on the graph. The algebraic calculation is correct, but not rounded properly in the end.	**Unable** to manipulate the exponential equation to verify the graphical prediction.	

* When work is judged to be limited or insufficient, the teacher makes decisions about appropriate intervention to help the student improve.