Name: ____ Date: ___________________

Out of the Swimming Pool

Sandra and Tim have a circular above-ground pool in their backyard that is 5 meters in diameter. They decide to have the water drained from the pool before the winter season. They hire Paul's Pool Service to pump the water from the pool.

The water is pumped from the swimming pool at a constant rate. Below is one representation of the amount of water (in liters) remaining in the pool after n minutes have passed since the pump started emptying the full pool: $f(n) = 20{,}100 - 100n$

1. In the function $f(n) = 20{,}100 - 100n$ (where n is the number of minutes that have passed since the pump started emptying the full pool), what might the values 20,100 and 100 represent in the context of the problem?

2. How much water is in the pool after 10 minutes of pumping?

   After 25 minutes of pumping?

3. How many minutes will it take to empty the pool?

Paul from Paul's Pool Service uses the function $f(n) = 100(201 - n)$ to represent the same quantity—that is, the amount of water (in liters) remaining in the pool after n minutes have passed since the pool was full.

4. Are the two functions $f(n) = 20{,}100 - 100n$ and $f(n) = 100(201 - n)$ equivalent? How can you use a graph or table to show that these two functions either represent the same function or do not represent the same function?

5. Show algebraically that these two functions represent either the same function or different functions.

6. Why might it be helpful for Paul to write the function as $f(n) = 100(201 - n)$?

7. Write two equivalent functions for the following situation: a pool that started with 38,500 liters of water is being emptied at a rate of 100 liters per minute.

8. Write two equivalent functions for the following situation: a pool starts with 20,100 liters of water and can be completely emptied in 167 minutes and 30 seconds.

Out of the Swimming Pool		Rubric
The core elements of performance required by this task are: • Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context Based on these, credit for specific aspects of performance should be assigned as follows	points	section points
1. Gives correct answers: 20,100 represents the initial amount of gallons of water in the swimming pool. 100 represents how many gallons of water are pumped out per minute.	1 1	2
2. Gives correct answers: After 10 minutes: **19,100 gallons** After 25 minutes: **17,600 gallons**	1 1	2
3 Gives correct answer: **201 minutes**	1	1
4. Gives correct answer: **The functions are equivalent.** Gives correct explanation such as: If you were to graph each function, it would be the same line. If you were to use a table, you would have the same input and output values in both tables.	1 1 1	3
5. Gives correct answer such as: $20{,}100 - 100n = 100(201 - n)$ $\frac{(20{,}100-100n)}{100} = \frac{100(201-n)}{100}$ $201 - n = 201 - n$	1	1
6. Gives correct answer such as: It is easier for Paul to calculate the amount of water in the pool per minute with his function.	1	1
7. Gives correct answers such as: $\boldsymbol{f(n) = 38{,}500 - 100n}$ $\boldsymbol{f(n) = 100(385 - n)}$	1	1
8. Gives correct answers such as: $\boldsymbol{f(n) = 20{,}100 - 120n}$ $\boldsymbol{f(n) = 120(167.5 - n)}$	1	1
Total Points		**12**