### Lesson 9 Practice Problems

1. A party will have hexagonal tables placed together with space for one person on each open side:
* 
	1. Complete this table showing the number of people $P\left(n\right)$ who can sit at $n$ tables.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| * + $n$
 | * + 1
 | * + 2
 | * + 3
 | * + 4
 | * + 5
 |
| * + $P\left(n\right)$
 | * + 6
 | * +
 | * +
 | * +
 | * +
 |

* 1. Describe how the number of people who can sit at the tables changes with each step.
	2. Explain why $P\left(3.2\right)$ does not make sense in this scenario.
	3. Define $P$ recursively and for the $n^{th}$ term.
1. Diego is making a stack of pennies. He starts with 5 and then adds them 1 at at time. A penny is 1.52 mm thick.
	1. Complete the table with the height of the stack $h\left(n\right)$, in mm, after $n$ pennies have been added.
	2. Does $h\left(1.52\right)$ make sense? Explain how you know.

| * $n$
 | * $h\left(n\right)$
 |
| --- | --- |
| * 0
 | * $7.6$
 |
| * 1
 | *
 |
| * 2
 | *
 |
| * 3
 | *
 |

1. A piece of paper has an area of 80 square inches. A person cuts off $\frac{1}{4}$ of the piece of paper. Then a second person cuts off $\frac{1}{4}$ of the remaining paper. A third person cuts off $\frac{1}{4}$ what is left, and so on.
	1. Complete the table where $A\left(n\right)$ is the area, in square inches, of the remaining paper after the $n^{th}$ person cuts off their fraction.
	2. Define $A$ for the $n^{th}$ term.
	3. What is a reasonable domain for the function $A$? Explain how you know.

| * $n$
 | * $A\left(n\right)$
 |
| --- | --- |
| * 0
 | * 80
 |
| * 1
 | *
 |
| * 2
 | *
 |
| * 3
 | *
 |

1. Here is the recursive definition of a sequence: $f\left(1\right)=35,f\left(n\right)=f\left(n−1\right)−8$ for $n\geq 2$.
	1. List the first 5 terms of the sequence.
	2. Graph the value of each term as a function of the term number.
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* (From Unit 1, Lesson 7.)
1. Here is a graph of sequence $q$. Define $q$ recursively using function notation.
* 
* (From Unit 1, Lesson 6.)
1. Here is a recursive definition for a sequence $f$: $f\left(0\right)=19,f\left(n\right)=f\left(n−1\right)−6$ for $n\geq 1$. The definition for the $n^{th}$ term is $f\left(n\right)=19−6⋅n$ for $n\geq 0$.
	1. Explain how you know that these definitions represent the same sequence.
	2. Select a definition to calculate $f\left(20\right)$, and explain why you chose it.
* (From Unit 1, Lesson 8.)
1. An arithmetic sequence $j$ starts 20, 16, . . . Explain how you would calculate the value of the 500th term.
* (From Unit 1, Lesson 8.)



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