**Stack of Cups**

Your team works for a paper products company that creates different-size paper cups. You are responsible for designing the packaging for a new paper cup design. Your design team must design a cardboard carton that could be used to package the cups for sale. Since this is a new product for your team, you must study the cups to determine which features of the cup affect the height of a stack of cups.

You will be given a set of cups. First measure the height of one cup. Then add additional cups and measure the height of resulting stack. Continue until you have at least five measurements.

|  |  |
| --- | --- |
| **# of Cups** | **Height of Stack (cm)** |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

1. Graph your data on the coordinate plane below. Include a title, and label and scale the axes appropriately.



1. Describe a rule that fits the pattern.
2. What would happen if you moved to the left on the graph? (What height corresponds to a stack of zero cups?)
3. Write a formula for the height *h* of your stack of *n* cups.
4. Another team at the company performed a similar experiment with a different cup. They came up with the formula, *h* = 8.2 + 0.5*n*, where *h* is the height of a stack of *n* cups. What information can you get from this formula?
5. A third team at the company did a similar experiment with a different cup. They came up with the rule: start with a height of 5.25 for the first cup and add 0.75 for each additional cup.

* 1. What information can you get from this rule?
	2. Write a formula based on the information you got from the rule.

8. Your boss just gave your team the following data on a new cup design. Your job is to determine the heights of cartons that would hold stacks of 25, 50, and 100 cups.

|  |  |
| --- | --- |
| **# of Cups** | **Height of Stack (cm)** |
| 1 | 14.2 |
| 2 | 14.8 |
| 3 | 15.4 |
| 4 | 16.0 |
| 5 | 16.6 |

1. Write a rule and a formula that model the boss’s data, using n for the number of cups and H for the height of the stack.

 Rule:

 Formula:

1. Find the stack height for 25 cups.
2. Find the stack height for 50 cups.
3. Find the stack height for 100 cups.