

REPRESENTING YOUR BUNGEE

How can we safely select a bungee cord for each jumper? This was one of the questions that the Bridge Bungees CEO needs you to answer. Today, you will experiment, collect data, and create a mathematical model to begin answering this question.

1. Attach 3 weights to a bungee cord that is **4 bands** long. Drop the weight from your jumping platform and record the *fall distance*.
2. Repeat Question 1, this time using 3 weights attached to cords of **different lengths**.
 - a. What is the fall distance for a 5-band cord? 6-band? 7-band?
 - b. Create a table and graph of your results.
 - c. Predict the fall distance for a 15-band cord.
 - d. Predict the number of cords needed for a fall of 100 inches.
 - e. (+) Create a rule that predicts the fall distance of a 3-weight jumper based on the number of bands in the bungee cord.
3. Repeat Question 2, this time using a **different number of weights** (instead of 3). Again, complete Parts a-e with this new setup.
4. (+) Can you build a single rule that will predict the fall distance based on *both* the length of the bungee cord and the jumper's weight?



ON YOUR OWN

Representing Your Bungee

Can I explain how rules, tables, and graphs are connected?
When given one of these, can I build (and use) the others?

1. Write a rule for each of the following In-Out tables. Express each rule as a sentence, describing what to do with the In to get the Out.

a.

In	Out
10	23
5	13
1	5
0	3

b.

In	Out
1	3
3	17
10	66
6	38

c.

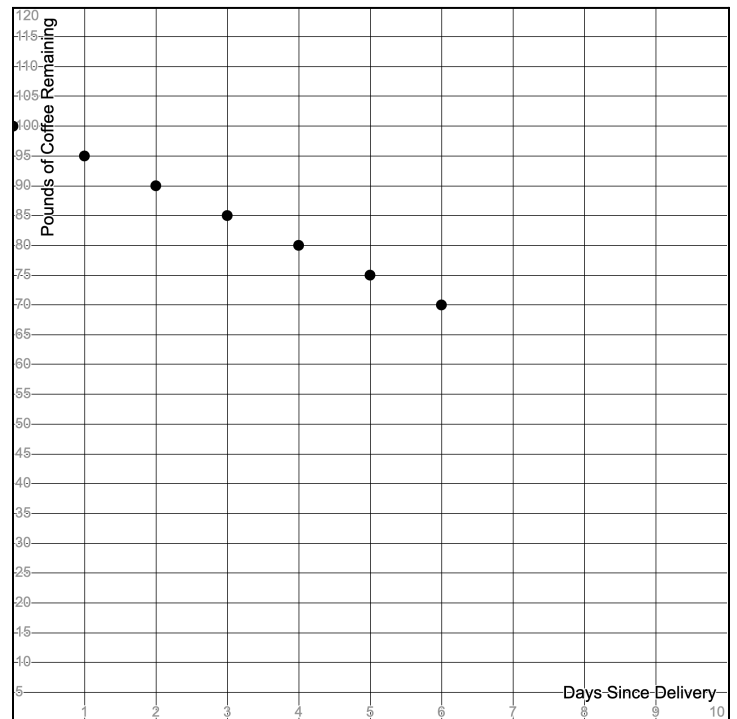
In	Out
3	17
8	12
15	5
0	20

d.

In	Out
10	30

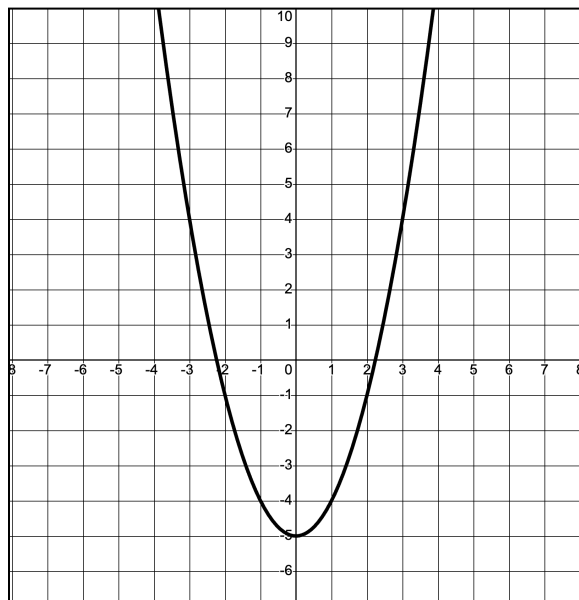
2. The local coffee shop checks their supply of coffee beans at the end of each day. This helps them know when they might run out and, as a result, when they should order more from their supplier. The graph on the right shows the data from their record-keeping.

- a. Make an In-Out table from the graph, where In is the number of days since the last order and Out is the amount of coffee remaining.
- b. Create a rule that will tell the coffee shop how much coffee will be left based on the number of days since their last order.



3. (+) The graph shown on the right does not have a context, but can be approached the same way you did Question 2!

- a. Make an In-Out table where the In is the x value and the Out is the y value.
- b. Create a rule that describes what to do with the In in order to get the Out.



4. (+) In Section 1 of this unit, you used spreadsheets to build and interpret expressions for financial situations. But spreadsheets are also very useful for seeing the connections between tables, graphs, and rules. Spreadsheet template: <https://tinyurl.com/MtMtableit>

- a. This spreadsheet template is pre-made for you. Type **=2*B3+3** into cell C3 and press 'RETURN'. Then, click on the lower right hand corner of cell C3 and drag your cursor down to the end of the table. When you release, the table should auto-fill to apply the same 'rule' to all of the inputs. If done correctly, it will match the table from Question 1a and provide a matching graph.

	A	B	C	D
1				
2		In	Out	
3		10	23	
4		5		
5		1		
6		0		
7				
8				
9				
10				

- b. Repeat this process, but enter a new rule into cell C3. Try **=2*B3+15** instead. Be sure to click and drag to apply the new rule to the entire table. What seems to happen to the graph? Can you explain why?
- c. Predict what will happen if you change the rule to **=2*B3-1**. Then, check and see if you are right.
- d. Invent some of your own rules to try. Write down a few observations and questions based on your investigation.