Worksheet Review

1a. \(26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = ?\)
   - 26 ways to choose a letter
   - 10 ways to choose a number

What if no repeat letters or numbers allowed?
   \(26 \cdot 25 \cdot 24 \cdot 10 \cdot 9 \cdot 8 \cdot 7\)

1b. Phone number with area code
   * Area code must not begin with 0 or 1.

In old phone numbers,
   - Second digit has to be 0 or 1
   \((8 \cdot 2 \cdot 10) \cdot 8 \cdot 10 \cdot 10 \cdot 10 = 8 \cdot 2 \cdot 10^7 = 2 \cdot 8 \cdot 10^7\)
   * This one is 5 times bigger

In new phone numbers
   \((8 \cdot 10 \cdot 10) \cdot (8 \cdot 10 \cdot 10 \cdot 10 \cdot 10) = 8 \cdot 10 \cdot 10^7 = 8 \cdot (8 \cdot 10^7)\)

When do we divide?
   How many 4-topping pizzas can you build with 10 possible toppings?

\[
\begin{array}{c}
10 \cdot 9 \cdot 8 \cdot 7 \\
4 \cdot 3 \cdot 2 \cdot 1 \\
\end{array}
\]

Keep track of weights! Build some pizza

Trill Problem

Trill 1: Exactly one of us is a Knave.
Trill 2: Exactly one of us is a Knight.
Trill 3: We're all Knaves.

Suppose this is true. Then Trill 2 must be the Single Knave, and Trill 3 is a Knight.
So Trill 2 says that exactly one trill is a Knight, which implies Trill 1 is a liar. Contradiction.

If he's a truth-teller, he's led you he's a Knave, which is a liar. That's a contradiction.
He must be a Knave, and there must be at least