MATH 130A Review: Factorials and Counting

1. You have 7 clean shirts. While planning on going on a trip, you decide to pack 3 clean shirts. How many different combinations are there?

\[
\binom{7}{3} = \frac{7!}{(7-3)!3!} = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{4 \cdot 3 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 1} = \frac{7 \cdot 5}{1} = 35
\]

Solution:

2. A friend tells you their favorite three digit number consists of 3 unique numbers. For example, 901 is one possibility. How many total possibilities are there?

\[
\frac{10!}{(10-3)!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{10 \cdot 9 \cdot 8}{1} = 720
\]

Solution: