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CS 2102 - DMT1 - FALL 2019 — LUTHER TYCHONIEVICH  
ADMINISTERED IN CLASS FRIDAY OCTOBER 25, 2019

## QUIZ 07

You may answer any question with factorial, choose, and unresolved arithmetic notation, but may not use ellipses. For example, the following are all OK:  $\boxed{120}$ ,  $\boxed{5!}$ ,  $\boxed{\frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{(2 \cdot 1)(3 \cdot 2 \cdot 1)}}$ ,  $\boxed{\binom{5}{3}}$ .

1.  $\binom{52}{5}$  \_\_\_\_\_ I draw five cards from a deck of 52 distinct cards. How many distinct hands of cards could I get?

2.  $8!$  \_\_\_\_\_ How many ways of shuffling a list of 8 distinct numbers are there?

3.  $\frac{8!}{1! \cdot 2! \cdot 3! \cdot 2!}$  \_\_\_\_\_ How many permutations of the sequence  $(\perp, \top, \top, \emptyset, \emptyset, \emptyset, \lambda, \lambda)$  are there?

4.  $7776^6$  \_\_\_\_\_ My passphrase is six random words taken from a list of 7776 unique words. If I allow words to be repeated, how many passphrases can be created in this method?

5.  $\frac{7776!}{7770!}$  \_\_\_\_\_ My passphrase is six random words taken from a list of 7776 unique words. If I do not allow words to be repeated, how many passphrases can be created in this method?

6.  $8 \cdot 2 - 1 = 15$  \_\_\_\_\_ I roll two fair eight-sided dice and total the result. How many possible totals could I roll?

7.  $\frac{1 + 1 + 1}{8^2}$  \_\_\_\_\_ I roll two fair eight-sided dice and total the result. What is the chance the total will be 4?

8.  $\frac{20 + 20}{20 + 20 + 17}$  \_\_\_\_\_ I have a bag of 20 cyan balls, 20 yellow balls, and 20 magenta balls. I took three out, all the same color, and gave them away. If I reach in randomly and draw another ball, what is the chance it will be a different color than the first three?

9.  $\frac{20 + 20}{20 + 20 + 20}$  \_\_\_\_\_ I have a bag of 20 cyan balls, 20 yellow balls, and 20 magenta balls. I took three out, all the same color, then put them back in. If I reach in randomly and draw another ball, what is the chance it will be a different color than the first three?

10.  $\frac{1}{1000}$  \_\_\_\_\_ A special lottery lets you pick a 3-digit number (including 0 as 000); one number, determined but not revealed when the lottery was created, causes you to win \$100 if you are the first person to pick it. 500 people have picked numbers so far (you don't know what they picked) and none have won. If you pick the next number, what is the chance you'll win the \$100?