

You are ordering a Domino's American Legends pizza.
You need to pick the size, the crust, and the variety.
How many selections are possible?

AVAILABLE OPTIONS

Sizes

- Small (10")
- Medium (12")
- Large (14")
- X-Large (16")



CRUSTS



ORDER NOW

Hand Tossed



ORDER NOW

Deep Dish



ORDER NOW

Crunchy Thin



ORDER NOW

Brooklyn Style

DOMINO'S AMERICAN LEGENDS®



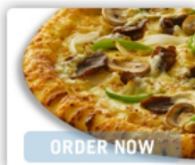
ORDER NOW

Wisconsin 6 Cheese
Robust tomato sauce,



ORDER NOW

Honolulu Hawaiian
Pizza



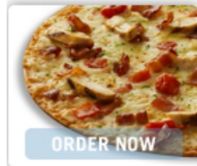
ORDER NOW

Philly Cheese Steak
Pizza



ORDER NOW

Pacific Veggie Pizza
Roasted red peppers,



ORDER NOW

Cali Chicken Bacon
Ranch™ Pizza



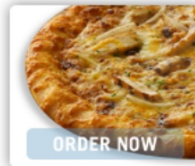
ORDER NOW

Fiery Hawaiian™
Pizza



ORDER NOW

Buffalo Chicken
Pizza



ORDER NOW

Memphis BBQ
Chicken Pizza

12-1 Counting and Permutations

Fundamental Counting Principle

of ways to complete task = # of ways to choose 1st part x # of ways to choose 2nd part x # of ways to choose 3rd part x ...

1) CA license plates have 1 digit, 3 letters, and 3 digits.

a) How many possible license plates? $\frac{10}{\text{digit}} \times \frac{26 \times 26 \times 26}{\text{letters}} \times \frac{10 \times 10 \times 10}{\text{digits}}$
 175,760,000

b) How many possible license plates that begin with a "3" if no letter can be repeated? $\frac{1}{\text{"3"}} \times \frac{26 \times 25 \times 24}{\text{letters}} \times \frac{10 \times 10 \times 10}{\text{digits}}$
 15600,000

- 2) Five-question multiple choice quiz, with A, B, C, D answers.
How many ways to complete the quiz?

$$\underline{4} \times \underline{4} \times \underline{4} \times \underline{4} \times \underline{4} \quad 4^5 = 1024$$

A *permutation* is an ordering of objects.

3 You have homework in 5 classes tonight.

a) In how many different ways can you complete the homework

$$5! = \frac{5}{\text{1st hw}} \times \frac{4}{\text{2nd hw}} \times \frac{3}{\dots} \times \frac{2}{\dots} \times \frac{1}{\text{5th hw}} = 120 \text{ ways}$$

b) In how many different ways can you do only 3 of the assignments?

notation: ${}^n P_r$

total things \uparrow permutations \rightarrow at a time \rightarrow

$$5 P_3 = \frac{5}{(5-3)!} = \frac{5!}{2!} = \frac{5 \cdot 4 \cdot 3 \cdot \cancel{2 \cdot 1}}{\cancel{2 \cdot 1}} = 60 \text{ ways}$$

4) How many distinguishable permutations of the letters M, O, M?

$$\frac{3!}{2!} = \frac{3 \cdot 2!}{2!} \text{ MOM, OMM, MMO} = 3$$

permutations of n objects with repetitions

$$\frac{n!}{r_1! \cdot r_2! \cdot r_3! \cdot \dots}$$

r_1, r_2, r_3
repeated objects

5) Your dog has 8 puppies, 5 males and 3 females. One possible birth order is MMMMMFFF. How many different birth orders are possible?

$$\frac{8!}{(5! \times 3!)} = \frac{8 \cdot 7 \cdot 6 \cdot 5!}{3 \cdot 2 \cdot 5!} = 56$$

M F