1) $81^{\frac{3}{2}}$ ← power, ← root

$9^3 = 729$

8) $h^{-1}(x)$ $\quad h(x) = x^2 + 4$

$y = x^2 + 4$

$x = y^2 + 4$

$x - 4 = y^2$

$\pm\sqrt{x-4} = y$

10)

Section 10.1

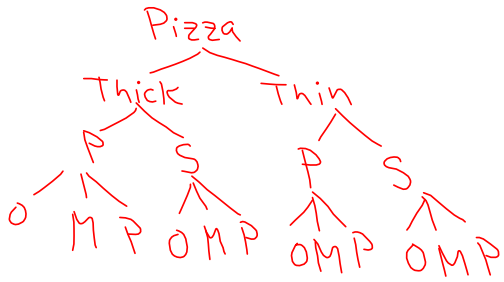
Fundamental counting principle: m·n·p

different possible outcomes where m, n, p are separate events.

Small amounts you can use a tree diagram

How many combinations of pizza are possible? 12 Pizza

Given: thin or thick crust
pepperoni or sausage
olives, mushrooms or pineapple



What if the problem is too big to draw a tree diagram?

How many ways can you frame a picture?

$12 \cdot 55 \cdot 12$

Frame color Mat

7,260

Given: 12 frame styles
55 colors for styles
11 shades of blue mat

License Plates

3 letters followed by 3 digits

Repeat: $\underset{L}{26} \cdot \underset{L}{26} \cdot \underset{L}{26} \cdot \underset{D}{10} \cdot \underset{D}{10} \cdot \underset{D}{10}$

$17,576,000$

No Repeats: $26 \cdot 25 \cdot 24 \cdot 10 \cdot 9 \cdot 8$

$11,232,000$

Number or letter:

R: $36 \cdot 36 \cdot 36 \cdot 36 \cdot 36 \cdot 36$ $\quad 36^6 = 2,176,782,336$

No Repeat

$36^7 = 7.8\ E^{10}$

$36^8 = 2.82\ E12$

Permutation: Order matters

$$ {}_nP_r = \frac{n!}{(n-r)!} $$

r = # choosing
n = total

Factorials
0! = 1 by definition
1! = 1
2! = 2·1 = 2
3! = 3·2·1 = 6
4! = 4·3·2·1 = 24

Calculate:

${}_5P_3$ $\frac{5!}{(5-3)!} = \frac{5!}{2!} = 60$

What would 12! equal?
12·11·10·9·8·7·6·5·4·3·2·1 = 479,001,600

${}_{24}P_5$ = 5,100,480

How many ways can you burn 4 of 12 songs onto a CD? 11,880 $P\binom{12}{4}$ ${}_{12}P_4$

How many ways can you select a President, VP and secretary from a group of 10 people?

${}_{10}P_3 = 720$

Distinguishable Permutations

How many ways to write EYE

EEY
EEY
YEE

$\frac{3!}{2!} = 3$

MIAMI

$\frac{(5!)}{(2!2!)} = 30$

MISSISSIPPI

34,650

$\frac{11!}{4!4!2!}$