

# Combination Permutation Problems

Tuesday, November 20, 2018 12:47 PM

11/20/18  
1332  
Dr. Jensen  
K. McWay

Comedies: 17

Pick 4

$17 \cdot 16 \cdot 15 \cdot 14$  ← how many ways I can pick 4 plays (in order)  
 $4 \cdot 3 \cdot 2 \cdot 1$  ← the order I could pick them

We divide because overall, it doesn't matter which order we pick the plays in.

License plate: 3 letters, then 3 #'s

$26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10$

letters      digits 0-9

order does matter. Don't divide!

Harry Potter Series has 7 books

How many ways can you put them on the shelf?

$7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

How many ways can you "correctly" order them?

1

order: 1, 2, 3, 4, 5, 6, 7

Factorial:  $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

Defn: The probability of an event happening is # of ways the event happens divided by the total # of possible outcomes

36 names in a hat

$$P(\text{draw names in order}) = \frac{1}{36!}$$

↑ probability  
 ← 1 way to draw them in order  
 ← 36! ways to draw 36 names out of a hat.

Roulette 36 numbers

the odds are 35:1

So if you bet \$100 on #13 and it lands on #13,  
you get  $35 \cdot 100 = \$3,500$  in winnings.