

Day #1 **Counting**

1. $\frac{8!}{7!} = ?$ 2. $\frac{6!4!}{8!3!} = ?$ 3. $\frac{9!}{2!2!4!} = ?$

Day #2 **Permutations** Note: Permutations are where **order is important**.

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

1. 5P5
 2. 5P3
 3. 4 balls of different color, how many arrangements?
 4. How many different “words” using letters is *depot*?
 5. How many different 3 letter “words” using letters is *depot*?
 6. How many different “words” using letters in *calculus*?
 7. How many different “words” using letters is *depot*?
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Day #3 **Combinations** Note: Combinations are where **order is not important**.

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

1. 8C3 =
 2. Given 5 different coins. Find how many different 2 coin pay outs can there be?
 3. Given a committee of 9 women and 7 men. Find how many subcommittees of 3 women and 3 men can be formed.
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Day #4 **Binomial Theorem**

$$\binom{6}{2} = {}_6C_2 = \frac{6!}{2!4!} = \frac{6 \cdot 5 \cdot 4!}{2 \cdot 1 \cdot 4!} = 15$$

$$(a+b)^2 = a^2 + 2ab + b^2 = {}_2C_0 a^2 b^0 + {}_2C_1 a^1 b^1 + {}_2C_2 a^0 b^2 = \binom{2}{0} a^2 b^0 + \binom{2}{1} a^1 b^1 + \binom{2}{2} a^0 b^2$$

$$(a+b)^3 = \binom{3}{0} a^3 b^0 + \binom{3}{1} a^2 b^1 + \binom{3}{2} a^1 b^2 + \binom{3}{3} a^0 b^3 = a^3 + 3a^2 b + 3ab^2 + b^3$$

$$r\text{th term of } (\diamond + \Delta)^n = \binom{n}{r-1} \diamond^{n-(r-1)} \Delta^{r-1}$$

1. Find the 4th term of $(2x - 3y)^4$.
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Day #5 Pascal's Triangle

Note: Sum of #'s in any row is 2^n and the triangle is symmetric to a vertical line.

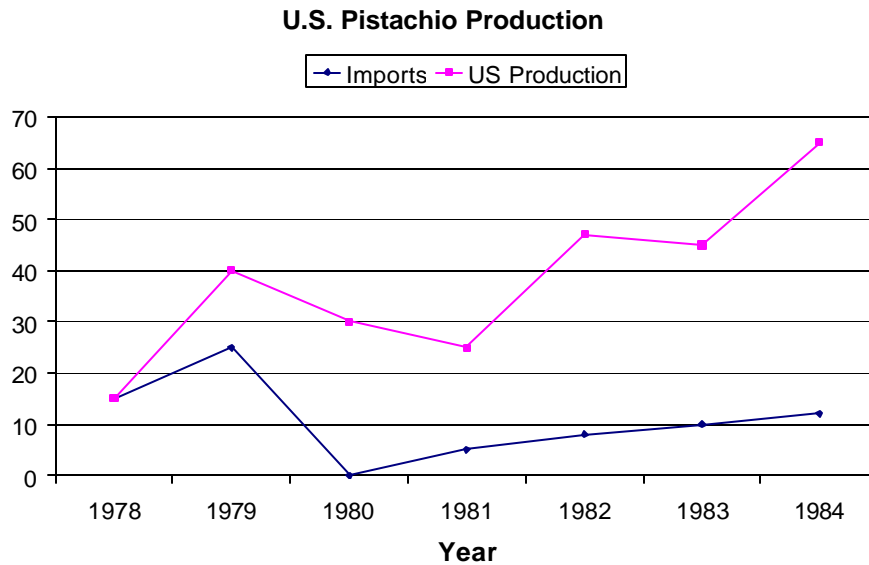
1					
0C0					
1					1
1C0					1C1
1		2		1	
2C0		2C1		2C2	
1		3		1	
3C0		3C1		3C2	
1		4		1	
4C0		4C1		4C2	
1		6		1	
6C0		6C1		6C2	
1		7		1	
7C0		7C1		7C2	
1		8		1	
8C0		8C1		8C2	
1		9		1	
9C0		9C1		9C2	
1		10		1	
10C0		10C1		10C2	

1. Find the 3rd number in row 10 of Pascal's Triangle.

Day #6 Tree Diagrams

1. Take a quiz with 3 true/false questions. How many ways could you answer?
2. 4 roads from Diamond Bar to Chino Hills and 3 roads from Chino Hills to Ontario. How many ways from Diamond Bar to Ontario?

Day #7 Comparative Graphs



1. In 1981, how many pounds were produced? How many pounds imported?
 2. Number of pounds imported ever greater than number of pounds produced?
 3. U.S. production increasing or decreasing in 1979?
 4. In general, increase or decrease over 7 years for US production?
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Day #8 Central Tendencies

Median = middle value (half-way if 2 in middle)
Mode = most frequent value
Mean = average value

Find mean, median, and mode for:

- {124, 155, 172, 117, 146, 138, 151, 160, 142}
- {64, 87, 62, 87, 63, 98, 76, 54, 87, 58, 70, 76}
- Company salaries: 2 partners @ \$100,000 & 8 employees: 2 @ \$25,400, 2 @ \$19,200, 4 @ \$17,400. Find the mean, median, and mode salaries.

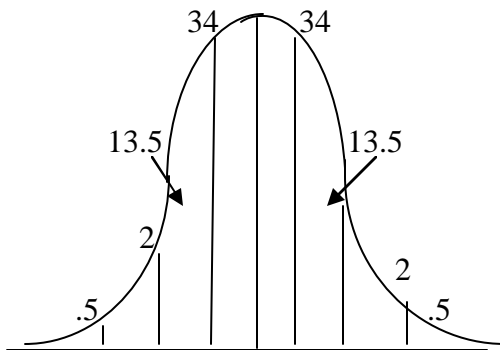
Day #9 Dispersion

Range = difference between greatest and least values
Standard Deviation = average measure of how much each value differs from the mean

$$= \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}} \quad \left\{ \begin{array}{l} n = \text{number of values} \\ x_i = \text{value} \\ \bar{x} = \text{mean} \end{array} \right.$$

- Range for {37, 41, 33, 42, 29, 34}
- Standard Deviation to nearest hundredth for {35, 40, 45}
- Mileage in miles per gallon were:
25, 13, 24, 18, 29, 12, 30, 16, 25, 21, 28, 25, 33, 11, 22, 12, 30, 16, 28, 23
Find the range, mean, standard deviation

Day#10 Statistic Day #4 Normal Distribution



Normal Distribution in %

- 68% 1 standard deviation
- 95% 2 standard deviations
- 99% 3 standard deviations

1000 values are normally distributed with mean = 26 and standard deviation = 2

- How many are in the range of 22 to 26?
- How many are less than 22?

A fair coin is tossed 100 times. If repeated many times the number of heads for every 100 tosses is normally distributed. Mean = 50 standard deviation = 5

- What percent show less than 50 heads?
 - More than 50 heads?
 - What percent show more than 65 heads?
 - What percent show between 40 and 60 heads?
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