Warm-Up

1. If the probability of an event is 2/9, what are the odds?

$$2:7$$

2. If the odds of an event are 3:11, what is the probability?

$$\frac{3}{14}$$

3. What is the probability of drawing a King or an Even Number from a deck of cards?

$$\frac{4}{52} + \frac{20}{52} - \frac{0}{52} = \frac{6}{13}$$

4. How many 9 letter patterns can be formed from the letters in SCARECROW?

$$\frac{9!}{2!2!} = 90,720$$

Counting Principle

When finding the amount of outcomes of several independent events, multiply the possibilities together.

Permutations and Combinations

Calculating the number of ways you can choose something

<u>Permutation</u> - The number of ways you can select a certain amount of objects -

Order Matters

<u>Combination</u> - The number of ways you can select a certain amount of objects -

Order does not matter

Signs that it is a Permutation

- Positions are <u>listed</u> out
- The words: distinct, specific, sequence, arranged

1.In a race of 20 people, how many ways can there be 1st, 2nd and 3rd place finishers.

$$20 P 3 = 6,840$$

2. How many ways can 3 students be chosen from a class of 20 to leave class.

$$20 C 3 = 1,140$$

<u>Warm-up</u>

1) Solve: $\dfrac{6!}{4!}$

2) How many ways can you arrange the letters from the word PENCIL

3) What about ALGEBRA

In a contest in which there are 8 participants, in how many ways can 5 distinct prizes be awarded?

$8P5$

A club elects a president, vice-president, and secretary-treasurer. How many sets of officers are possible if there are 15 members and any member can be elected to each position? No person can hold more than one position.

$15 P 3$

From a group of 8 people, 5 will each win $1,000. How many different winning groups are possible?

8 C 5

A church has 7 bells in its bell tower. Before each church service 5 bells are rung in sequence. No bell is rung more than once. How many possible sequences are there?

7 P 5

Of a classroom filled with 20 students, 2 will be selected to stay after school and correct homework for extra credit. How many possibilities?

20 C 2

To win the lottery, one must correctly select 6 numbers from a collection of 50 numbers (one through 50). The order in which the selection is made does not matter. How many different selections are possible?

$$50 \ C \ 6$$

A work softball team has 15 players on its roster. There are 9 distinct positions in which these players can be placed. How many lineups can be fielded?

$$15 P 9$$

A test is administered with 15 questions. Students are allowed to answer any ten. How many choices of ten questions are there?

$$15 \text{ C } 10$$

How many arrangements can be made using 2 letters of the word HYPERBOLAS if no letter is to be used more than once?

HP   10P2

PH

Four freshmen are chosen from eighteen to be a member of the leadership board.

$$18 C 4$$

Four freshmen are chosen from eighteen to be the Class President, Vice President, Secretary, and Treasurer.

$$18 P 4$$

A teacher is creating a seating chart. How many ways can they seat 5 students out of 20 in the first row?

$$20 P 5$$

Choose five students in a class of twenty to form a group.

$20C5$

Choose six songs out of twenty to make a specific playlist for your party.

$20 P 6$

Choose six songs out of twenty
to download.

20C 6

Three trumpet players out of six are chosen for 1st chair, 2nd chair, and 3rd chair.

Three trumpet players out of six are chosen to play.

Five out of seven patients are called to remind them of their appointment.

Five out of seven patients are called to schedule a specific appointment time.

How many ways can you arrange the letters in the word FORMAT?

How many 3-digit numbers are possible using the digits 0, 1, 4,5, 7 and 9?

A class has 14 boys and 16 girls. The class has to elect one boy and one girl to be representatives on a committee. How many different ways can they select them?

$$\frac{8}{4} \frac{1}{3} \frac{6}{2} \frac{7}{1} \frac{4}{4} \frac{2}{3} \frac{2}{2} \frac{1}{1}$$

$$\frac{6!}{3! \, 2!}$$

How many ways can you place 9 books on a shelf?