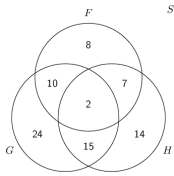## Warm Up

1) F = 2,7,8, 10
G or H = 24,10,2,15,14,7
H and F = 7,2

2) Jake, Sally, and Haley all competed in the 100m Dash. In how many ways can they finish the race?

$$3 \cdot 2 \cdot 1 = 6$$
$$_3P_3$$
$$3!$$

Mar 9-1:00 PM

Questions on HW?

13 at least 3
(3 or more)

3 or 4 or 5
+   +

Mar 9-1:09 PM

1.5: MIXED COMBINATIONS AND PERMUTATIONS

Learning Targets:
- Determine whether a situation involves permutations or combinations
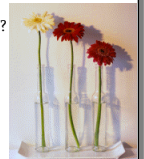- Understand the mathematical implications of the words 'and' & 'or'

Mar 9-1:12 PM

There are 12 players on the basketball team. In how many ways can the coach choo

In how many ways can three different vases be arranged on a tray?

$$_3P_3$$
$$3 \cdot 2 \cdot 1 = 6$$

Mar 9-1:14 PM

Determine whether each situation involves a permutation or a combination.

1. a classroom seating chart   P

2. the batting order of the Washington Nationals   P

3. 10 books on a library shelf   C

4. a seven-person committee for prom   C

5. a hand of five cards from a deck of 52 cards   P

Mar 9-1:18 PM

Permutation or Combination?

1. In a long distance foot race, how many different ways can the first 5 finishers occur if 50 people are in the race?

$$_{50}P_5 = 254,251,200$$

2. From 9 equally qualified students, how many different ways are there to select from 3 of them for scholarships of equal amounts?

$$_9C_3 = 84$$

3. How many ways can a president, vice president, and treasurer be selected from 7 people?

$$_7P_3 = 210$$

Mar 9-1:22 PM

4. There are 25 people who applied for 4 scholarships ($5000, $2500, $2000, $1000). How many different ways can the 4 people be selected?

$$_{25}P_4 = 303,600$$
$$\underline{25} \cdot \underline{24} \cdot \underline{23} \cdot \underline{22}$$

5. How many ways can a subcommittee of 3 people be selected from 7 people?

$$_7C_3 = 35$$

Mar 9-1:24 PM

Some combination and permutation problems are more complex in that you also have to use the Fundamental Counting Principle as well as the fact that "and" means multiply and "or" means add

If there are 7 women and 5 men in a club,

a) How many different committees of 4 people can be selected?

$$_{12}C_4 = 495$$

b) How many different committes of 3 women and 2 men can be formed?

$$_7C_3 \cdot {}_5C_2 = 350$$

Mar 9-1:26 PM

Complex Permutations & Combinations

1. Three soccer teams have 12, 15, and 18 players, respectively. Each team must choose 1 delegate and one alternate to represent their team at a meeting in order to play in the state tournament. In how many ways can this be done?

$$_{12}P_2 \cdot {}_{15}P_2 \cdot {}_{18}P_2 = 8,482,320$$

2. Suppose 54 democrats and 46 republicans sit in the US Senate. How many ways can a committee of 4 democrats and 3 republicans be chosen?

$$_{54}C_4 \cdot {}_{46}C_3 = 4,800,690,180$$

Mar 9-1:31 PM

A committee of 5 people must be selected from 5 men and 8 women. How many ways can this selection be done if there have to be at least 3 women on the committee?

$$\overline{3 \text{ or } 4 \text{ or } 5}$$

3W·2M   or   4W·1M or   5W·0M

$$_8C_3 \cdot {}_5C_2 \quad + \quad _8C_4 \cdot {}_5C_1 + \quad _8C_5 \cdot {}_5C_0$$

$$560 \quad + \quad 350 \quad + \quad 56 =$$

$$= 966$$

Mar 9-1:34 PM

Today's Assignment:

Section 1.5

#1-5, 7-14, 17-20

Learning Targets:
• Determine whether a situation involves permutations or combinations
• Understand the mathematical implications of the words 'and' & 'or'

Mar 9-1:35 PM