

# 9.1D HW KEY

Saturday, May 9, 2015 12:43 PM

Precalculus  
Section 9.1 Notes - Day 4  
Combinations and Permutations Practice

Name: *Key*  
Period:

1. A couple has narrowed down the choice of a name for their new baby to three first names and five middle names. How many different first- and middle- name arrangements are possible?

$$3 \cdot 5 = \boxed{15}$$



2. How many ways can three men and three women be seated in a row:

- a. So that no two men nor two women are seated next to each other?

$$\begin{array}{cccccccc} M & W & M & W & M & W & \text{or} & W & M & W & M & W & M \\ 3 & 3 & 2 & 2 & 1 & 1 & & 3 & 3 & 2 & 2 & 1 & 1 \\ & & 36 & & & & & & & 36 & & & & \end{array}$$

- b. If one specific couple must be in the middle?

$$\begin{array}{cccc} 4 & 3 & \boxed{2!} & 2! \\ 4! & 2! & = & \boxed{48} \end{array}$$

3. In how many ways can 4 people be seated in a row of 12 chairs?



$${}_{12}P_4 = \frac{12!}{8!} = 12 \cdot 11 \cdot 10 \cdot 9 = \boxed{11,880}$$

4. From a standard deck of 52 cards, a 5 card hand is dealt. In how many ways can the hand include:

- a. All face cards? *4 suits - 3 face cards ⇒ 12 total face cards*

$${}_{12}C_5 = \frac{12!}{5!7!} = \boxed{792}$$

- b. No face cards?

$${}_{40}C_5 = \frac{40!}{5!35!} = \boxed{658,608}$$

- c. At least one face card?

$${}_{52}C_5 - {}_{40}C_5 = \boxed{1,940,952}$$



5. Five boys and five girls stand in a line. How many arrangements are possible if:

a. All of the boys stand in succession?

$$5! \rightarrow \text{Boys} \quad 5! \cdot 6! = 86400$$

$\overline{1} \quad \overline{2} \quad \overline{3} \quad \overline{4} \quad \overline{5} \quad \overline{6}$

b. The boys and girls stand alternately?

$$B G B G B G B G B G$$

$$5! 5! = 14400 \times 2 = 28800$$

6. How many distinguishable arrangements can be formed from the letters in **TALLAHASSEE**?

$$\frac{11!}{3!2!2!2!} = 831,600$$



7. Out of a group of 5 sophomores and 7 juniors, a committee of 4 students is being formed to help plan Hinsdale Central's Graduation ceremony.

a. How many committees are possible?

$${}_{12}C_4 = \frac{12!}{4!8!} = 495$$

b. What if the committee is to be comprised of only juniors?

$${}_{7}C_4 = \frac{7!}{4!3!} = 35$$

c. What if the committee must have either all juniors or all sophomores?

$${}_{5}C_4 = \frac{5!}{4!1!} = 5 \quad 35 + 5 = 40$$

d. What if the committee must have at least one sophomore?

$${}_{12}C_4 - {}_{7}C_4 = 460$$

$$495 - 35$$