AFM
Module 3
Permutations & Combinations Worksheet

Name key

1. The school board has seven members
   a. The board must have three officers: a chairperson, an assistant chairperson, and a secretary. How many different sets of these officers can be formed from this board? $P(7,3) = 210$
   b. How many three-person committees can be formed from this board? $C(7,3) = 35$
   c. Is part (a) asking for a number of permutations or a number of combinations? What about part (b)? a- permutations
      b- combinations
2. Kandi Barr has room for three plants on a windowsill.
   a. In how many different ways can three plants be arranged on her windowsill? $P(3,3) = 6$
   b. Was (part a) a permutation or a combination? Permutation
   c. Suppose Kandi has six plants. How many groups of three plants can be put on her windowsill? $C(6,3) = 20$
   d. Was (part c) a permutation or a combination? Combination
   e. Suppose Kandi has nine plants. How many ways can three of these plants be arranged on her windowsill? $P(9,3) = 504$
   f. Was (part e) a permutation or a combination? permutation
3. To open your locker, you must dial a sequence of three numbers called the lock's *combination*. Given that there are 40 numbers on a lock, how many different locker combinations are there? $P(40,3) = 59280$
4. Suppose fifteen people qualify for a college cheerleading squad, six women and nine men.
   a. How many six-member squads can be selected? $C(15,6) = 5005$
   b. Suppose that exactly two members of the six-member squad must be male. How many six-member squads can be selected? $C(9,2) \cdot C(6,4) = 540$
   c. Find the probability of the event in part (b) if you were to pick the squads randomly.

omit

5. Ten band directors at a summer band camp are planning to give a performance. One of the pieces they want to play calls for a flute, an oboe, a bassoon, and a clarinet. Each of the band directors can play all four instruments. How many different quartets can they have?

$P(10,4) = 5040$

6. A pizza parlor offers a selection of 3 different cheeses and 9 different meats. In how many ways can a pizza be made with the following ingredients?

   a) 1 cheese and 3 meats $C(3,1) \cdot C(9,3) = 252$

   b) 2 cheese and 5 meats $C(3,2) \cdot C(9,5) = 378$

   c) 3 cheese and no meat $C(3,3) \cdot C(9,0) = 1$

7. For each of the following, determine whether each situation involves a permutation or a combination.

   a) Four recipes were selected for publication our of the 302 recipes that were submitted. C

   b) Nine players are selected from a team of 15 to start the softball game. C

   c) Four out of 200 contestants were awarded prizes of $100, $75, $50 and $25. P

   d) The batting order for the 9 starting players is announced. P

   e) The winner and first, second, and third runners-up in a contest with 10 finalists. P

   f) An arrangement of the letters in the word *HAWAIIAN*. P

   g) Selecting three of fifteen flavors of ice cream at the grocery store. C

   h) Selecting nine books to check out of the media center from a reading list of twelve. C

   i) Selecting three students from our class to go get breakfast at Bojangles. C

8. How many different 12-member juries can be chosen from a pool of 32 people?

$C(32,12) = 225792840$

9. A test consists of 20 questions, and students are told to answer 15 of them. In how many different ways can they choose the 15 questions? $C(20,15) = 15504$

10. How many different ways are there to purchase 2 CDs, 3 DVDs, and 1 VHS tape if there are 7 CD titles, 5 DVD titles, and 3 VHS titles?

$C(7,2) \cdot C(5,3) \cdot C(3,1) = 630$

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