

Combinations Problems

11/22/09

1. How many ways are there to pick the following, if all the objects are different:

- (a) Pick 2 objects from 1 object?
- (b) Pick 2 objects from 2 objects?
- (c) Pick 2 objects from 3 objects?
- (d) Pick 2 objects from 4 objects?
- (e) Pick 2 objects from 5 objects?
- (f) Pick 2 objects from 7 objects?
- (g) Pick 2 objects from 10 objects?
- (h) Pick 2 objects from 15 objects?
- (i) Pick 2 objects from 20 objects?
- (j) Pick 2 objects from 40 objects?
- (k) Do you see a pattern?
 - i. Can you guess how many ways there are to pick 2 from 100?
 - ii. How about 2 from 1,000 objects?
 - iii. 2 objects from 1,000,000 objects?

2. How many ways are there to pick the following, if all the objects are different:

- (a) Pick 3 objects from 2 objects?
- (b) Pick 3 objects from 3 objects?
- (c) Pick 3 objects from 4 objects?
- (d) Pick 3 objects from 5 objects?
- (e) Pick 3 objects from 6 objects?
- (f) Pick 3 objects from 7 objects?
- (g) Pick 3 objects from 10 objects?
- (h) Pick 3 objects from 20 objects?
- (i) Do you see a pattern? How many ways are there to pick 3 from 100?

3. Write out the following expressions in factorial form:

(a) $\binom{5}{2} =$

(b) $\binom{12}{6} =$

(c) $\binom{80}{46} =$

(d) $\binom{125}{14} =$

(e) $\binom{300}{150} =$

4. Write a problem for each of the following expressions. For example, $\binom{4}{2}$ could be “How many ways can you pick two people from a group of four?”

(a) $\binom{10}{5}$

(b) $\binom{5}{3}$

5. Simplify the following expressions (multiply them out and cancel whatever you can):

(a) $\binom{10}{5} \times \binom{5}{2}$

(b) $\binom{12}{7} \times \binom{7}{5} \times \binom{5}{3}$

(c) $\binom{7}{5} \times \binom{6}{3} \times \binom{3}{2}$

6. **How many ways are there to choose two teams of four people from a group of 10 people?