

## Counting Principles Practice

Date \_\_\_\_\_ Period \_\_\_\_\_

**Evaluate each expression.**

1)  ${}_5P_4$

120

2)  ${}_8P_3$

336

3)  ${}_{20}C_4$

4845

4)  ${}_{15}C_5$

3003

**State if each scenario involves a permutation or a combination.**

- 5) The batting order for seven players on a 11 person team.

permutation - batting **order** so order matters

- 6) A group of 30 people are going to run a race. The top 7 finishers advance to the finals.

combination - top 7 so you could be 1st/2nd/3rd/etc and still be in the top 7

- 7) 4 out of 13 students will ride in a car instead of a van

combination - all 4 who are chosen are riding in the van - it doesn't matter when they were picked

- 8) There are 10 applicants for two jobs: computer programmer and software tester.

permutation - the two jobs are different - being hired as a programmer is different from being hired as a software tester

**State if each scenario involves a permutation or a combination. Then find the number of possibilities.**

- 9) A group of 20 people are going to run a race. The top 6 finishers advance to the finals.

combination  
 ${}_{20}C_6 = 38,760$  possibilities

- 10) The student body of 20 students wants to elect a president, vice president, secretary, and treasurer.

permutation  
 ${}_{20}P_4$  (4 since there are 4 different positions)  
116,280 possibilities

- 11) Shanice has homework in seven subjects. She is deciding what order to complete them in.

permutation  
 ${}_7P_7 = 5,040$  possibilities

- 12) There are 50 applicants for four Systems Engineer positions.

combination  
 ${}_{50}C_4 = 230,300$  possibilities

- 13) A team of 6 basketball players needs to choose a captain and co-captain.

permutation  
 ${}_6P_2 = 30$  possibilities

- 14) The student body of 40 students wants to elect four representatives.

combination  
 ${}_{40}C_4 = 91,390$  possibilities