

Worksheet 11.6b

State if each scenario involves a permutation or a combination.

- 1) A team of 8 basketball players needs to choose a captain and co-captain.

Permutation

- 3) The batting order for seven players on a 12 person team.

Permutation

- 2) Rob and Mary are planning trips to nine countries this year. There are 13 countries they would like to visit. They are deciding which countries to skip.

Combination

- 4) There are 45 applicants for three Computer Programmer positions.

Combination

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

- 5) Castel and Joe are planning trips to three countries this year. There are 7 countries they would like to visit. One trip will be one week long, another two days, and the other two weeks.

$${}_7P_3 = 210$$

- 7) You are setting the combination on a three-digit lock. You want to use the numbers 123 but don't care what order they are in.

$${}_3P_3 = 6$$

- 9) A team of 17 softball players needs to choose three players to refill the water cooler.

$${}_{17}C_3 = 680$$

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

$${}_{10}P_4 = 5040$$

- 13) There are 15 applicants for four jobs: Computer Programmer, Software Tester, Manager, and Systems Engineer.

$${}_{15}P_4 = 32,760$$

- 6) There are 110 people at a meeting. They each shake hands with everyone else. How many handshakes were there?

$${}_{110}C_2 = 5995$$

- 8) A group of 25 people are going to run a race. The top 8 finishers advance to the finals.

$${}_{25}C_8 = 1,081,575$$

- 10) 5 out of 13 students will ride in a car instead of a van

$${}_{13}C_5 = 1287$$

- 12) Selecting which seven players will be in the batting order on a 11 person team.

$${}_{11}P_7 = 1663200$$

- 14) A group of 45 people are going to run a race. The top three runners earn gold, silver, and bronze medals.

$${}_{45}P_3 = 85,140$$

Answer the following only.

15. A restaurant offers four sizes of pizza, two types of crust, and eight toppings. How many possible combinations of pizza with one topping are there?

$$\frac{4}{\text{SIZE}} \cdot \frac{2}{\text{CRUST}} \cdot \frac{8}{\text{TOPPING}} = 64 \text{ combinations}$$

16. How many ways can 5 paintings be lined up on a wall?

$${}_5P_5 = 120 \text{ ways}$$

17. Rob has 4 shirts, 3 pairs of pants, and 2 pairs of shoes that all coordinate. How many outfits can you put together?

$$\frac{4}{\text{SHIRT}} \cdot \frac{3}{\text{PANTS}} \cdot \frac{2}{\text{SHOES}} = 24 \text{ outfits}$$

18. Grace loves to eat salad! How many salads can she put together if she can pick out one type of lettuce from 2 choices, one vegetable from 4 choices and one dressing from 7 choices?

$$\frac{2}{\text{LETTUCE}} \cdot \frac{4}{\text{VEGGIE}} \cdot \frac{7}{\text{DRESSING}} = 56 \text{ salads}$$

19. How many 5-digit numbers can be formed (using 0 - 9)?

can't use ZERO →  $\frac{9}{\quad} \frac{10}{\quad} \frac{10}{\quad} \frac{10}{\quad} \frac{10}{\quad} = 90,000$

20. How many 5-digit numbers can be formed if each one uses all the digits 0, 1, 2, 3, 4 without repetition?

can't use ZERO →  $\frac{4}{\quad} \frac{4}{\quad} \frac{3}{\quad} \frac{2}{\quad} \frac{1}{\quad} = 96$   
 ↑  
 now can use ZERO