

HW Key

Monday, December 7, 2015 3:12 PM

Precalculus Section 10.1 Extra Practice

1. You have organized an outing with two separate groups of friends to a concert. One of your groups of friends has 7 people in it and the other has 5. Together the 13 of you are going to sit together but you are running late so you just hand out the tickets very quickly to all of your friends.

- a) How many different ways can you and your friends be seated?

$$13!$$

- b) What is the probability that you sit next to your crush (assuming you only have a crush on one of your friends)?

$$\frac{2 \cdot 12!}{13!}$$

- c) What is the probability that each group of friends sits with only people from that group?

$$\frac{3! \cdot 7! \cdot 5!}{13!}$$



2. Given the letters in the word: SKETCHPAD

- a) How many different ways can you rearrange the letters?

$$9!$$

- b) What if the word was SKETCHPADS? How many different ways could you rearrange those letters?

$$\frac{10!}{2!}$$

- c) From SKETCHPAD How many 5-letter "words" can you create without repeating letters?

$${}^9P_5 \Rightarrow \underline{9} \cdot \underline{8} \cdot \underline{7} \cdot \underline{6} \cdot \underline{5}$$

- d) What is the probability that your 5-letter word will have 2 vowels?

$$\frac{{}^2P_2 \cdot {}^7P_3}{{}^9P_5}$$

3. Out of a standard deck of cards you are dealt a hand of five cards. What is the probability that you get exactly 2 Kings and 3 Queens.

$$\frac{{}^4C_2 \cdot {}^4C_3}{{}^{52}C_5}$$

4. A class of 12 Hinsdale Central high school students, 7 boys and 5 girls, are traveling to Springfield for spring Break! When they go out sightseeing, they must travel in groups of 7 students.

a. How many different groups can they form?

$${}_{12}C_7$$

b. What is the probability of forming a group with 4 girls?

$$\frac{{}_5C_4 \cdot {}_7C_3}{{}_{12}C_7}$$

c. What is the probability of forming a group of at least 4 boys?

$$\frac{{}_7C_4 \cdot {}_5C_3 + {}_7C_5 \cdot {}_5C_2 + {}_7C_6 \cdot {}_5C_1 + {}_7C_7 \cdot {}_5C_0}{{}_{12}C_7}$$

5. Metropolis is a really cool place to live, but the 5 digit addresses are created using the following rules:

- The first digit cannot be a 0 or 1
- The second digit has no restrictions
- The third digit must be even (0 is even)
- The fourth digit must be 6 or less
- The last digit must be a 0 or 5

a. How many possible valid addresses exist in Metropolis?

$$8 \cdot 10 \cdot 5 \cdot 7 \cdot 2 = 5600$$

b. If a 5-digit number is chosen at random, what is the probability it will be a valid address in Metropolis?

$$\frac{5600}{10^5}$$

$$\frac{10}{10} \cdot \frac{10}{10} \cdot \frac{10}{10} \cdot \frac{10}{10} \cdot \frac{10}{10}$$

6. Out of a standard deck of cards you are dealt a hand of 6 cards.

a. What is the probability that you get exactly 2 black cards?

$$\frac{{}_{26}C_2 \cdot {}_{26}C_4}{{}_{52}C_6}$$

b. What is the probability that you get at least 3 fours?

$$\frac{{}_4C_3 \cdot {}_{48}C_3 + {}_4C_4 \cdot {}_{48}C_2}{{}_{52}C_6}$$