

# Notes

Thursday, December 3, 2015 2:49 PM

## Probabilities with Permutations and Combinations

Warm-up:

Practice:

1. During the summer, you work 4 days a week at the local ice cream shop, assigned randomly from the 7 possibilities. What is the probability that your schedule for a given week does not assign you to work on the weekend?

$$\frac{\rightarrow 5^4}{\rightarrow 7^4}$$

↖ sample

2. You and your friend are in the studio audience at a TV game show. From the audience of 60 people, 3 are randomly selected as contestants. Find the probability that both you and your friend are chosen.

$$\frac{2^C_2 \cdot 58^C_1}{60^C_3}$$

$$\left( \frac{1}{60} \cdot \frac{1}{59} \cdot \frac{58}{58} \right) \cdot 3$$

me ← Buddy

3. Find the probability of winning a lottery in which you must correctly choose all 4 numbers from a selection of lottery numbers with integers 0 to 29. (Order is not important, numbers do not repeat)

$$\frac{1}{30^C_4}$$

← 4^C\_4

$$\frac{1}{30} \cdot \frac{1}{29} \cdot \frac{1}{28} \cdot \frac{1}{27}$$

4. Find the probability of winning the "Pick 4" lottery in which you must correctly select all 4 numbers from a selection of lottery numbers with integers 0 to 9. (Order is important, numbers can repeat)

$$\frac{1}{10 \cdot 10 \cdot 10 \cdot 10}$$

5. A class of Hinsdale Central students includes 1 sophomore, 5 juniors, and 6 seniors. If a group of 5 students is randomly selected, what is the probability the group includes 2 juniors and 3 seniors?

$$\frac{5C_2 \cdot 6C_3}{12C_5}$$

6. A committee of 3 people is to be randomly selected from the six people Archibald, Beatrice, Charlene, Denise, Eloise, and Fernando. Find the probability that:

$$6C_3$$

- a. Eloise is on the committee.

$$\frac{1C_1 \cdot 5C_2}{6C_3}$$

- b. Eloise and Fernando are on the committee.

$$\frac{2C_2 \cdot 4C_1}{6C_3}$$

- c. either Eloise or Fernando is on the committee.

$$\frac{1C_1 \cdot 5C_2 + 1C_1 \cdot 5C_2 - 2(2C_2 \cdot 4C_1)}{6C_3}$$

- d. Neither Eloise nor Fernando is on the committee  $2C_0 \cdot 4C_3 \Rightarrow$  (Not Perm)

$$\frac{2C_0 \cdot 4C_3}{6C_3}$$

- e. Archibald is on the committee and Beatrice is not.

$$\frac{1C_1 \cdot 1C_0 \cdot 4C_2}{6C_3}$$

- f. Archibald and Beatrice are on the committee but Charlene is not.

$$\frac{2C_2 \cdot 1C_0 \cdot 3C_1}{6C_3}$$