Homework Review: 13.1



3:7

prob: event can happen
total outcomes

total outcomes

odds: event event

can i can not
happen

18 girls

18 (prob) $\frac{18}{35}$ (Pab) 18:17

Finding Probabilities by using Permutations

What is a permutation?

A certain # of items

Order is important!

Example: HECK

3.

HECK

CHE KHEC

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Factorial Notation

$$6! = 6.5.4.3.2.1$$

Factorials give us a shorthand for calculating arrangements

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Permutation formulas

$$\begin{pmatrix}
0! = 1 \\
9! = 1 \\
-0! \\
-0! \\
-0! \\
-3P_3 = 3! \\
-3.2.1 \\
-6$$

$${}^{n}P_{r} = n! / (n-r)!$$

Permutation formulas allow us to make probability calculations using factorials

 $_{n}P_{n} = n!$ $_{n}P_{n} = the number of permutations$ $_{n}P_{n} = the number of permutations$ of n objects (arraying all the objects you have)

 $_{n}P_{r}$ = the number of permutations $nP_r = \frac{n!}{(n-r)!}$ or nobjects random (pick "r" objects) "n" objects)of n objects taken r at a time

$$\frac{30^{2}}{30^{2}} = \frac{30!}{(30-2)!} = \frac{30!}{38!}$$

$$\frac{1}{30} = \frac{30!}{30-2} = \frac{30!}{38!}$$

$$\frac{1}{30} = \frac{30!}{30-2} = \frac{30!}{38!}$$

10.
$$\frac{8}{3}$$

11.
$$\frac{12!}{9!}$$

12.
$$\frac{15!}{14!}$$

16.
$${}_{8}P_{7} = \frac{8!}{(8-7)!}$$
 ${}_{17}P_{6} = \frac{n!}{(10-6)!}$
 $= \frac{10!}{4!}$
 $= 40320$
 $= 151200$

18.
$$_{5}P_{0} = \frac{5!}{(5-0)!}$$

$$= \frac{5!}{5!} = 1$$

Find the number of ways you can arrange (a) all of the letters in the given word and (b) 2 of the letters in the word.

1. TACK

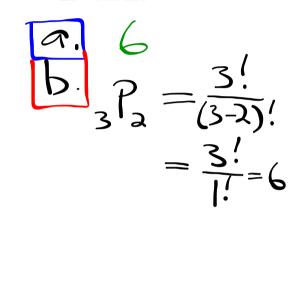
$$A \cdot P = 4! = 24$$

$$A \cdot P = 4! = 24$$

$$A \cdot P = 4!$$

$$A \cdot P$$

2. MAR



3. GAMER

$$5! = 5.4.3.2.1 = 120$$

$$5! = 5!$$

$$5 = \frac{5!}{3!}$$

$$= \frac{5.4.3!}{3!}$$

$$= 5.4 = 20$$

Soapbox Racing You are in a soapbox racing competition. In each heat, 7 cars race and the positions of the cars are randomly assigned.

- a. In how many ways can a position be assigned? 5040 (Sample space)
- **b.** What is the probability that you are chosen to be in the last position? Explain how you found your answer. $\frac{220}{2150} = .14$
- c. What is the probability that you are chosen to be in the first or second position of the heat that you are racing in? Explain how you found your answer. $\frac{720+720}{5040} = 2^{\circ}$
- **d.** What is the probability that you are chosen to be in the second or third position of the heat that you are racing in? *Compare* your answer with that in part (c).

In a recent survey, it was reported that of drivers who recently got in an accident, 75% of them were NOT eating food when they crashed their car. Is it therefore safer to eat while driving? Why or why not?

100 driving & crash 1025 divering & no 1075 = 7.5% 75 not eating 1000 not eating
$$\frac{25}{50} = 35$$
 were eating $\frac{25}{50} = 50\%$

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Homework:

p. 853, 4-32 even, 33