

Ch4 Practice Test KEY

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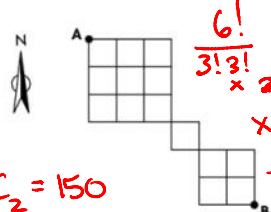
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Name _____ Date _____

CHAPTER 4 TEST

KEY

- In the final series between the top two teams of a soccer league, the first team to win two of three games is the champion.
 - Create a tree diagram, organized list, or outcome table to show the possible outcomes of the finals.
 - In how many ways can a team lose exactly one game but still win the championship?
- Solve each problem below. If you make any assumptions, state them.
 - How many ways are there to make a sandwich with egg salad or chicken salad, lettuce or tomato, butter or mayonnaise, on a whole wheat bun, a whole grain bagel, or a sesame seed bun?
 - How many four-digit passwords can be made from the digits 0 to 5, if digits can be repeated?
 - How many ways are there to draw a heart or club from a standard deck of 52 cards?
 - How many arrangements are there using all letters of the word TEETH?
 - Jim is ordering a large pizza with 3 toppings. There are 25 different toppings to choose from. How many different pizzas can he order?
- A book club offers a choice of 5 novels from a list of 10.
 - How many 5-novel selections can be made?
 - How many 5-novel selections can be made if the selections are to be ordered by preference?
 - Why are the answers to parts a) and b) different? Explain.
 - How are the answers to parts a) and b) related? Explain.
- Maria's school is at point A, and her part-time job is at point B. How many different ways can she walk to work from school, if she always walks south and east?



$$\frac{6!}{3!3!} \times 2! = 30 \times 2 \times 6 = 360$$
- Jim and Nanci belong to the Habitat for Humanity Club. There are five boys and six girls in the club. For each case below, how many ways can a committee of four be selected to work on building a house next Saturday?
 - There must be two boys and two girls.
 - There must be at least two girls.
 - Jim and Nanci must be on the committee.
 - There must be more boys than girls.
- Solve for $n \in \mathbb{N}$:
 - ${}_n P_4 = 60({}_n C_2)$
 - State the restrictions on n .
- How many different ways can the letters of SASKATOON be arranged if arrangements must start with a T and end with a K?

$$\frac{7!}{2!2!2!} = 105$$

Handwritten solutions for question 4:

- ${}_5 C_2 \times {}_6 C_2 = 150$
- ${}_6 C_2 \times {}_5 C_2 + {}_6 C_3 \times {}_5 C_1 + {}_6 C_4 = 265$
- $\underline{J} + \underline{N} + \text{---} \leftarrow {}_9 C_2 = 36$
- ${}_5 C_3 \times {}_6 C_1 + {}_5 C_4 = 65$

Handwritten solution for question 6a):

$${}_n P_4 = 60({}_n C_2)$$

$$\frac{n!}{(n-4)!} = 60 \left(\frac{n!}{2!(n-2)!} \right) \quad 2! = 2$$

Handwritten solution for question 7:

T I K

7 letters

$$\frac{7!}{2!2!2!}$$

S = 2
A = 3
O = 2

$$2! \cdot 2! \cdot 2! \quad 0 - 4 \\ = 630 \text{ ways.}$$

$$\frac{n!}{(n-4)!} = \frac{30n!}{2(n-2)!} \\ \left(\frac{n-2}{n}\right) \frac{n!}{(n-4)!} = \frac{30n!}{(n-2)!} \times \left(\frac{n-2}{n}\right)$$

$$\frac{(n-2)!}{(n-4)!} = 30$$

$$\frac{(n-2)(n-3)(n-1)!}{(n-4)!} = 30$$

$$n^2 - 5n + 6 - 30 = 0$$

$$n^2 - 5n - 24 = 0$$

$$(n-8)(n+3) = 0$$

$$n = 8 \quad n = -3 \\ \text{reject}$$

$$\boxed{n=8}$$

b) restrictions
 $n \geq 4$