

Probability Problems: All Possible Combinations

FOR TEACHERS:

These are examples of problems you can write on the board for your students to copy and practice in their math journals. There are endless variations. Making a list or chart, and drawing a picture in some cases, are the easiest ways to organize possible solutions. Sample problems should be solved as a whole group, and the organizational strategy should be taught prior to assigning independent practice with problems of this type.

1. **Using Numbers:** How many *different numbers* can be made using a three or four digit number?

Example: How many different numbers can you make from 4365, using each digit only once in each number you make?

Strategy: Make a list or use a chart:

4	3	6	5
4365	3465	6345	5346
4356	3456	6354	5364
4563	3546	6435	5436
4536	3564	6453	5463
4635	3645	6534	5634
4653	3654	6543	5643

2. Using Shapes:

Example: Mary has two squares. One is yellow and one is red. She also has an orange triangle, a green star, and a purple circle. How many different combinations can she make if she can only use one square in each combination?

Strategy: Draw a picture, or use a key and make a list or a chart.

3. Using Money

Example: Jerome has a one dollar bill and a five dollar bill. He also has 1 quarter, 1 dime, 1 nickel, and 1 penny. How many possible combinations can he make if he can only use one bill in each combination?

Strategy: Draw a picture, or use a key and make a list or chart.

Probability Problems: All Possible Combinations



Possible Toppings

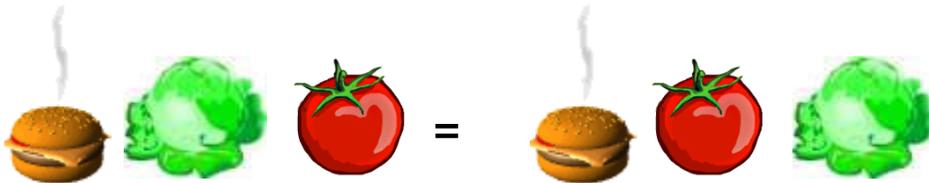
The Situation: Anne Tennahs decided to go out for a Space Burger at the Marsburg Burger Bar. The Burger bar serves two different types of burgers: Spinners and Jumpers. Each burger comes with two of the following toppings: lettuce, pickle, tomato, onion, or cheese. If you want more than two toppings, you have to pay extra. Anne likes all of the toppings! She bought a Spinner.



1. How many possible **different combinations** of 2 toppings could Anne choose to put on her Spinner Burger?

Hint: Use the chart below to help you organize your combinations:

Remember: (Spinner, Lettuce, Tomato) is the same as (Spinner, Tomato, Lettuce), so these two combinations only count as one because they are the same things in a different order.



Cross out any combinations you make that are the same things in a different order. The first one has been crossed out for you in the chart below.

Tomato	Onion	Lettuce	Cheese	Pickle
SB, T, O	SB, O, L			
SB, T, L	SB, O, C			
SB, T, C	SB, O, P			
SB, T, P	SB, O, T			

Tomato = T | Onion = O | Lettuce = L | Cheese = C | Pickle = P | Spinner Burger = SB

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Jack's Snacks



Jack was hungry after school. He made himself a peanut butter and jelly sandwich. Jack decided to have a drink and a treat with his sandwich. The drinks that were in the refrigerator were water, milk, and orange juice. The treats were potato chips, pretzels, and apples. How many combinations of drinks and treats can Jack make to go with his sandwich?

Use the chart in the space below to list the combinations of drinks and treats Jack can have with his sandwich. Each combination can only have one drink and one treat in it. There are extra rows in the chart. Use only the space you need.

Key	Potato Chips = C	Pretzels = P	Apple = A
	Orange Juice = O	Water = W	Milk = M

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Sock Combinations: Or “The Sock Goblins Strike Again!”

Your Mission: Figure out the possible combinations of 2 socks!

1. Read the problem
2. Show your work in the space below the problem!

The Problem: Marcy had five pairs of socks that she washed one Tuesday morning. (That's 10 socks in all!) The Sock Goblins in the dryer stole one sock from each pair, so Marcy had five socks left, none of which matched! Marcy decided that she would set a new fashion and save some money by wearing them anyway! All of the socks were different colors.

She had one purple sock, one pink sock, one blue sock, one red sock and one yellow sock.



Purple Pink Blue Red Yellow



How many different pairs of socks (or combinations of two socks) can Marcy make from these?

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Answer Keys:

1. Possible Toppings: 10 possible combinations of toppings:
~~_____~~ = same toppings repeated in a different order

Tomato	Onion	Lettuce	Cheese	Pickle
SB, T, O	SB, O, L	SB, L, C	SB, C, P	SB, P, T
SB, T, L	SB, O, C	SB, L, P	SB, C, T	SB, P, O
SB, T, C	SB, O, P	SB, L, O	SB, C, O	SB, P, L
SB, T, P	SB, O, T	SB, L, T	SB, C, L	SB, P, C

Tomato = T | Onion = O | Lettuce = L | Cheese = C | Pickle = P | Spinner Burger = SB

2. Jack's Snacks: Nine possible combinations

Snack/Drink	Potato Chips	Pretzels	Apple
Orange Juice	P, O	P, O	A, O
Water	P, W	P, W	A, W
Milk	P, M	P, M	A, M

Key	Potato Chips = C	Pretzels = P	Apple = A
	Orange Juice = O	Water = W	Milk = M

3. Sock Combinations: 10 possible combinations.

