

Counting the Outcomes of Experiments

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How to Count the Outcomes of an Experiment?

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1. Table

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1. Table
2. Tree Diagram

How to Count the Outcomes of an Experiment?

1. Table
2. Tree Diagram
3. Systematic Listing

How to Count the Outcomes of an Experiment?

1. Table
2. Tree Diagram
3. Systematic Listing
4. Fundamental Counting Principle (FCP)

Example 1

On a Saturday morning, you washed most of your clothes and they are still wet. Your friend invites you to attend his birthday party and you are left with only 2 pants and 3 shirts. In how many different ways can you dress?

Example 1: Using a Table

Example 1: Using a Table

Pants = 2 ways to choose

Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

	Pant 1	Pant 2
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Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

	Pant 1	Pant 2
Shirt 1	S_1P_1	S_1P_2

Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

	Pant 1	Pant 2
Shirt 1	S_1P_1	S_1P_2
Shirt 2	S_2P_1	S_2P_2

Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

	Pant 1	Pant 2
Shirt 1	S_1P_1	S_1P_2
Shirt 2	S_2P_1	S_2P_2
Shirt 3	S_3P_1	S_3P_2

Example 1: Using a Table

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

	Pant 1	Pant 2
Shirt 1	S_1P_1	S_1P_2
Shirt 2	S_2P_1	S_2P_2
Shirt 3	S_3P_1	S_3P_2

$$\therefore n(S) = 6$$

Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

P_1

Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

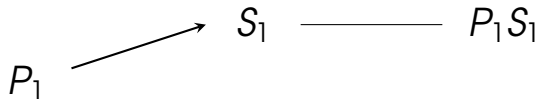


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

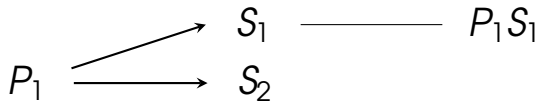


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

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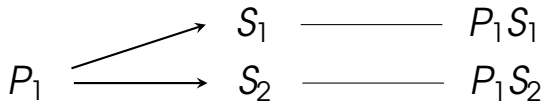


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

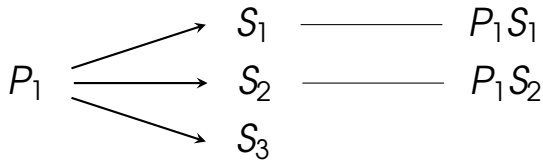


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

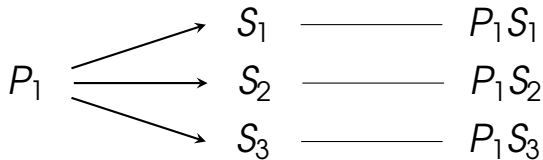


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

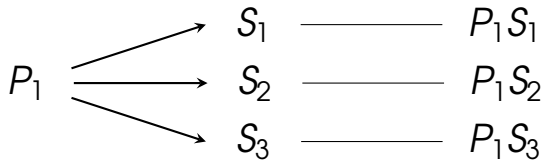


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$



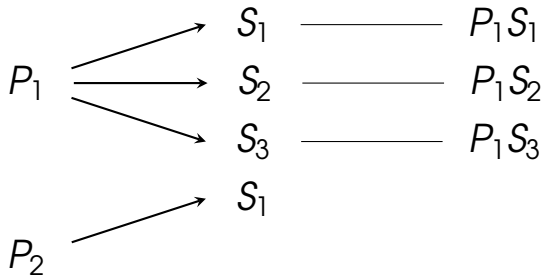
P_2

Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

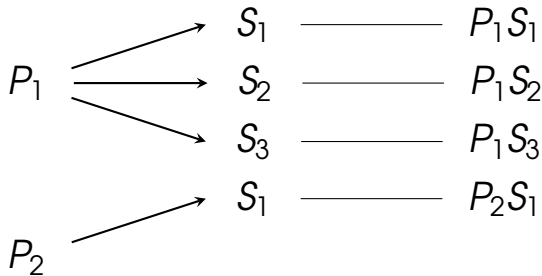


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

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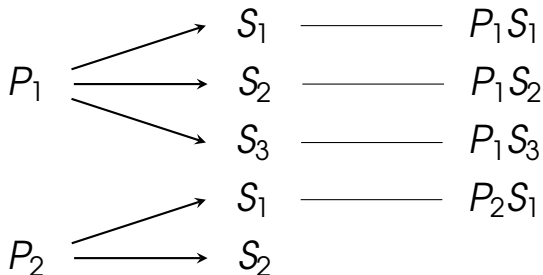


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

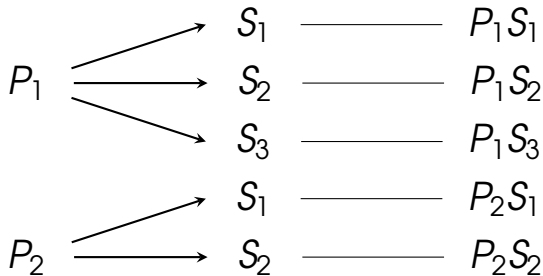


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

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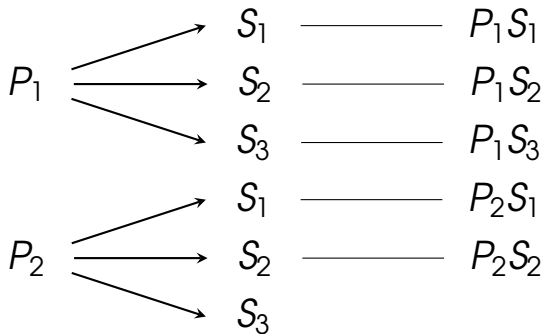


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

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$n(S) = ?$

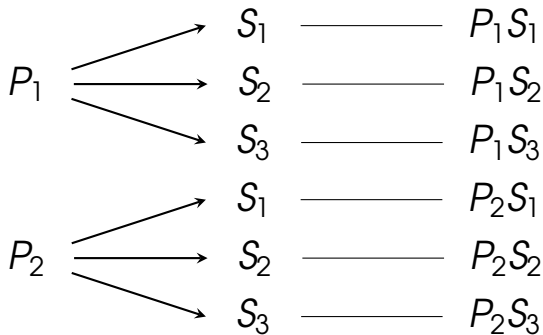


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

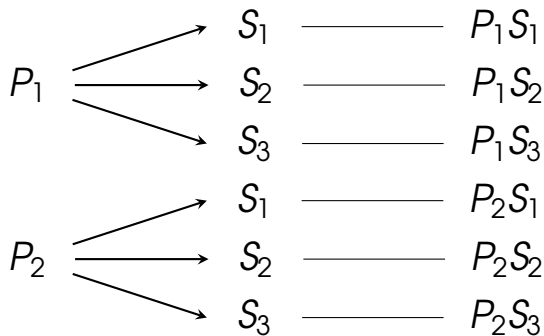


Example 1: Using a Tree Diagram

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$



$$\therefore n(S) = 6$$

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Pant 1 and Shirt 2

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Pant 1 and Shirt 2

Pant 1 and Shirt 3

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Pant 1 and Shirt 2

Pant 1 and Shirt 3

Pant 2 and Shirt 1

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Pant 1 and Shirt 2

Pant 1 and Shirt 3

Pant 2 and Shirt 1

Pant 2 and Shirt 2

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Pant 1 and Shirt 2

Pant 1 and Shirt 3

Pant 2 and Shirt 1

Pant 2 and Shirt 2

Pant 2 and Shirt 3

Example 1: Using Systematic Listing

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

Pant 1 and Shirt 1

Pant 1 and Shirt 2

Pant 1 and Shirt 3

Pant 2 and Shirt 1

Pant 2 and Shirt 2

Pant 2 and Shirt 3

$$\therefore n(S) = 6$$

What is the Fundamental Counting Principle?

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- ▶ We can find the total number of ways different events can occur by multiplying the number of ways each event can happen.

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- ▶ We can find the total number of ways different events can occur by multiplying the number of ways each event can happen.
- ▶ If one event can occur in m ways, and a second event can occur in n ways, and a third event can occur in p ways, and so on, then the sequence of events can occur in $m \times n \times p \times \dots$ ways.

Example 1: Using the Fundamental Counting Principle

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

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Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

$$n(S) = 2 \times 3$$

Example 1: Using the Fundamental Counting Principle

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

$$n(S) = 2 \times 3$$

$$n(S) = 6$$

Example 1: Using the Fundamental Counting Principle

Pants = 2 ways to choose

Shirts = 3 ways to choose

$n(S) = ?$

$$n(S) = 2 \times 3$$

$$n(S) = 6$$

\therefore there are 6 different ways you can dress

Example 2

Three 5-peso coins are tossed. How many outcomes are possible?

Example 2: Using a Table

Example 2: Using a Table

First coin = 2 outcomes

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
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Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH
H	H	T	HHT

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH
H	H	T	HHT
H	T	H	HTH

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH
H	H	T	HHT
H	T	H	HTH
H	T	T	HTT

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH
H	H	T	HHT
H	T	H	HTH
H	T	T	HTT
T	H	H	THH

Example 2: Using a Table

First coin = 2 outcomes

Second coin = 2 outcomes

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$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH
H	H	T	HHT
H	T	H	HTH
H	T	T	HTT
T	H	H	THH
T	H	T	THT

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First coin = 2 outcomes

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$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
H	H	H	HHH
H	H	T	HHT
H	T	H	HTH
H	T	T	HTT
T	H	H	THH
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First coin = 2 outcomes

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$n(S) = ?$

Coin 1	Coin 2	Coin 3	Outcome
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H	T	H	HTH
H	T	T	HTT
T	H	H	THH
T	H	T	THT
T	T	H	TTH
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H	T	H	HTH
H	T	T	HTT
T	H	H	THH
T	H	T	THT
T	T	H	TTH
T	T	T	TTT

$$\therefore n(S) = 8$$

Example 2: Using a Tree Diagram

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First coin = 2 outcomes

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$n(S) = ?$

Example 2: Using a Tree Diagram

First coin = 2 outcomes

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Third coin = 2 outcomes

$n(S) = ?$

1st Coin	2nd Coin	3rd Coin	Outcome
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Example 2: Using a Tree Diagram

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

1st Coin	2nd Coin	3rd Coin	Outcome
----------	----------	----------	---------

H			
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Example 2: Using a Tree Diagram

First coin = 2 outcomes

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Third coin = 2 outcomes

$n(S) = ?$

1st Coin	2nd Coin	3rd Coin	Outcome
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Example 2: Using a Tree Diagram

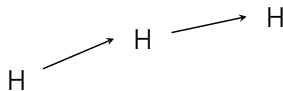
First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

1st Coin	2nd Coin	3rd Coin	Outcome
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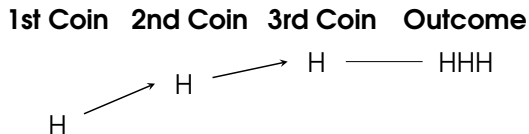
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First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$



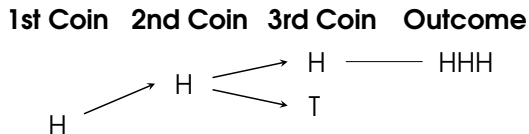
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$n(S) = ?$



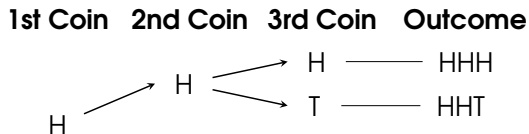
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$n(S) = ?$



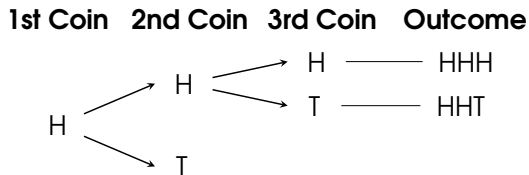
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Third coin = 2 outcomes

$n(S) = ?$



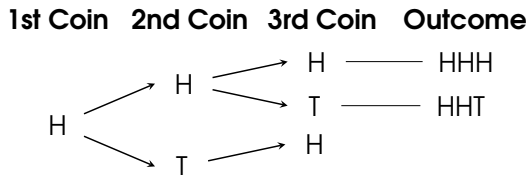
Example 2: Using a Tree Diagram

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Third coin = 2 outcomes

$n(S) = ?$



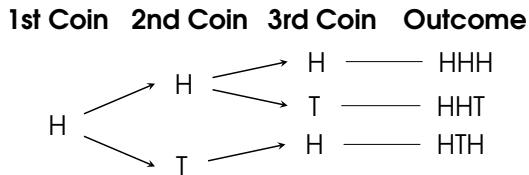
Example 2: Using a Tree Diagram

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$



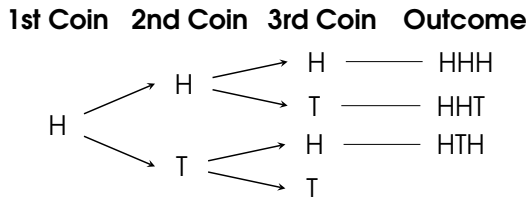
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First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$



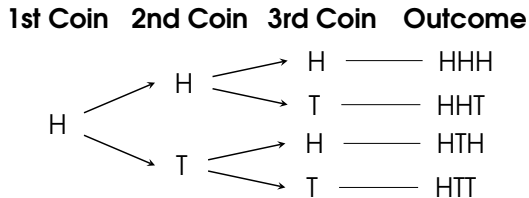
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Third coin = 2 outcomes

$n(S) = ?$



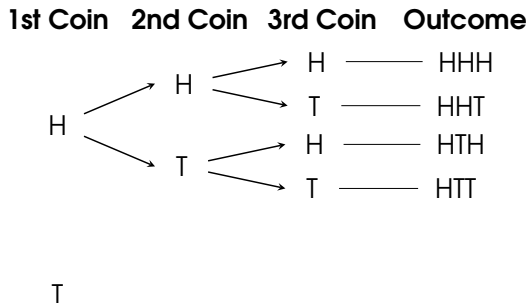
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$n(S) = ?$



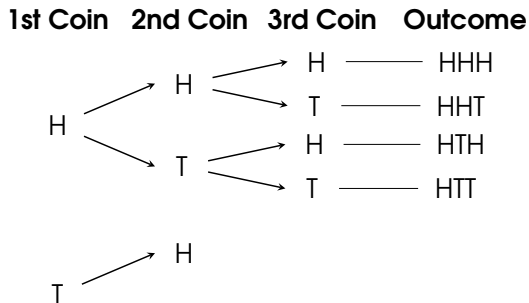
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First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$



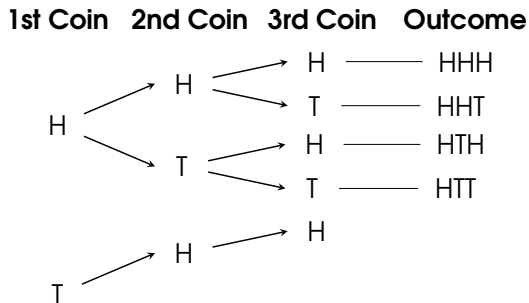
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$n(S) = ?$



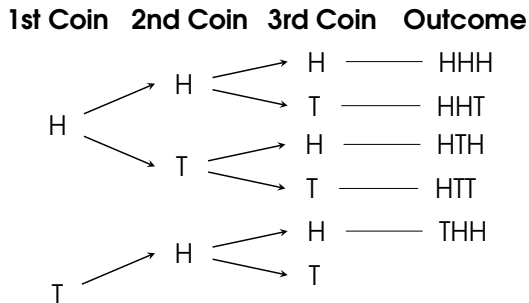
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$n(S) = ?$



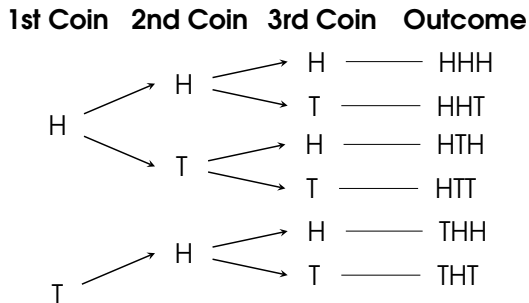
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$n(S) = ?$



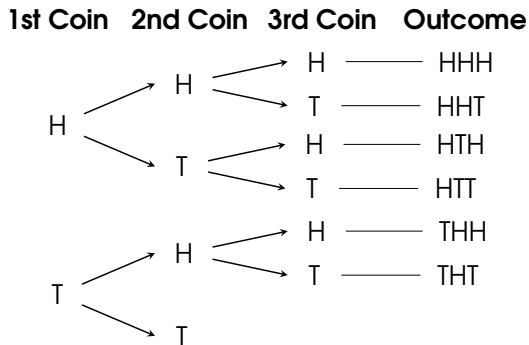
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$n(S) = ?$



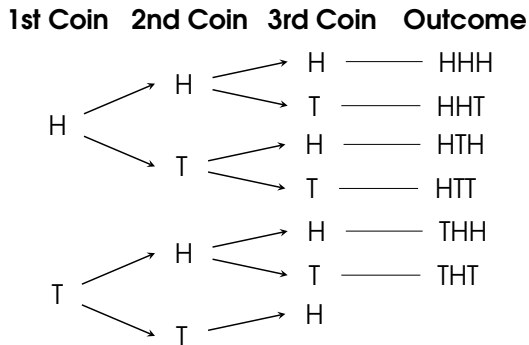
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$n(S) = ?$



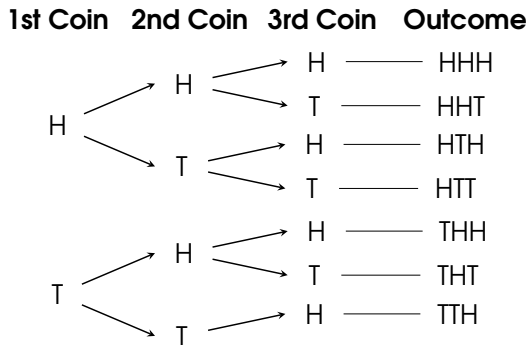
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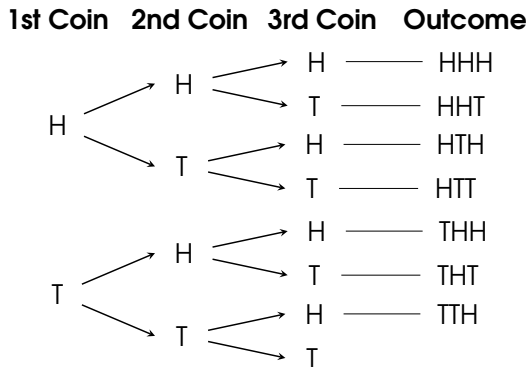
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$n(S) = ?$



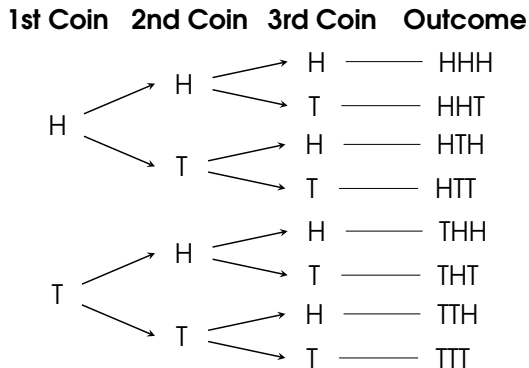
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First coin = 2 outcomes

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$n(S) = ?$



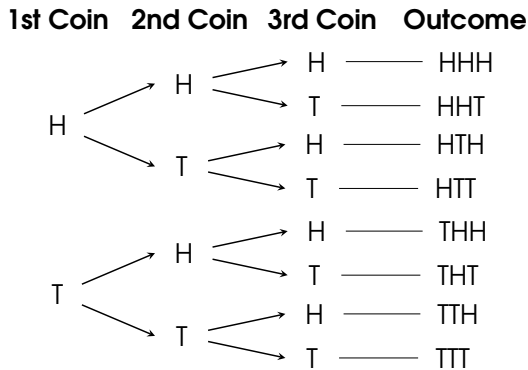
Example 2: Using a Tree Diagram

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$



$$\therefore n(S) = 8$$

Example 2: Using Systematic Listing

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First coin = 2 outcomes

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

HTT

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

HTT

THH

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

HTT

THH

THT

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

HTT

THH

THT

TTH

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

HTT

THH

THT

TTH

TTT

Example 2: Using Systematic Listing

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

HHH

HHT

HTH

HTT

THH

THT

TTH

TTT

$$\therefore n(S) = 8$$

Example 2: Using the Fundamental Counting Principle

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First coin = 2 outcomes

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First coin = 2 outcomes

Second coin = 2 outcomes

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Example 2: Using the Fundamental Counting Principle

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

Example 2: Using the Fundamental Counting Principle

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

$$n(S) = 2 \times 2 \times 2$$

Example 2: Using the Fundamental Counting Principle

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

$$\begin{aligned}n(S) &= 2 \times 2 \times 2 \\n(S) &= 8\end{aligned}$$

Example 2: Using the Fundamental Counting Principle

First coin = 2 outcomes

Second coin = 2 outcomes

Third coin = 2 outcomes

$n(S) = ?$

$$n(S) = 2 \times 2 \times 2$$

$$n(S) = 8$$

\therefore there are 8 outcomes possible

Example 3

You go to a restaurant to buy some breakfast. The menu says, for food: pancakes, waffles, or french fries; and for drinks: coffee, juice, hot chocolate, and tea. How many different meal choices do you have?

Example 3: Using a Table

Example 3: Using a Table

Food = 3 ways to choose

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

	Coffee (C)	Juice (J)	Hot Choco (H)	Tea (T)
--	-----------------------	----------------------	------------------------------	----------------

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

	Coffee (C)	Juice (J)	Hot Choco (H)	Tea (T)
Pancake (P)	PC	PJ	PH	PT

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

	Coffee (C)	Juice (J)	Hot Choco (H)	Tea (T)
Pancake (P)	PC	PJ	PH	PT
Waffles (W)	WC	WJ	WH	WT

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

	Coffee (C)	Juice (J)	Hot Choco (H)	Tea (T)
Pancake (P)	PC	PJ	PH	PT
Waffles (W)	WC	WJ	WH	WT
Fries (F)	FC	FJ	FH	FT

Example 3: Using a Table

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

	Coffee (C)	Juice (J)	Hot Choco (H)	Tea (T)
Pancake (P)	PC	PJ	PH	PT
Waffles (W)	WC	WJ	WH	WT
Fries (F)	FC	FJ	FH	FT

$$\therefore n(S) = 12$$

Example 3: Using a Tree Diagram

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

P

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

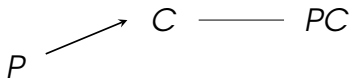


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

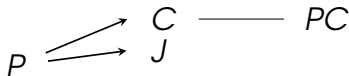


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

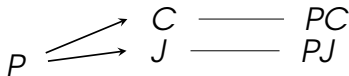


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

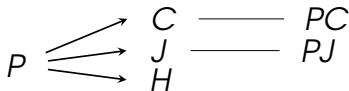


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

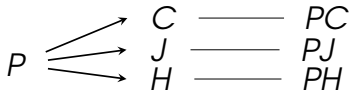


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

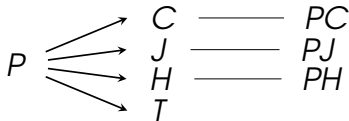


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

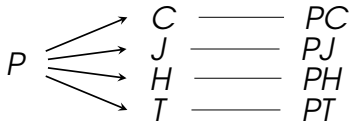


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

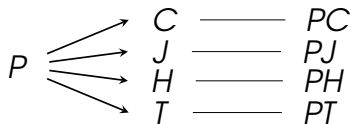


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$



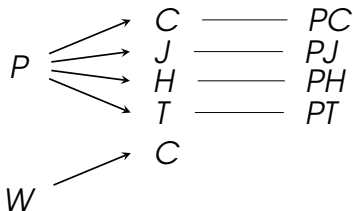
W

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

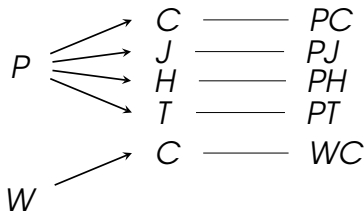


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

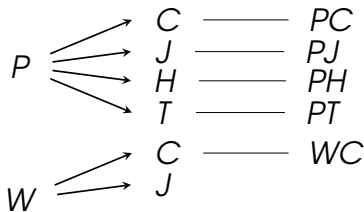


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

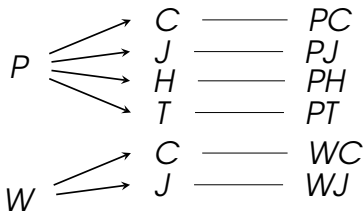


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

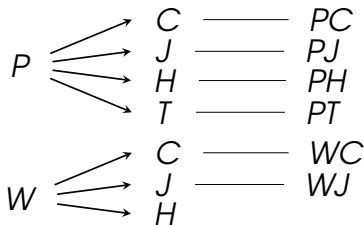


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

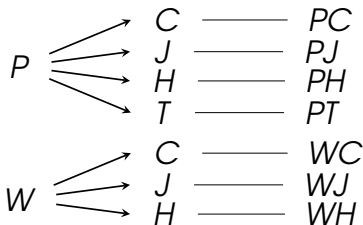


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

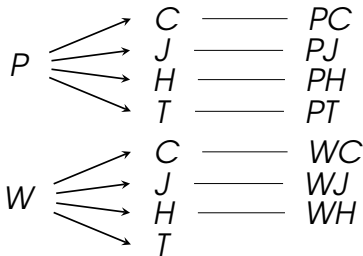


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

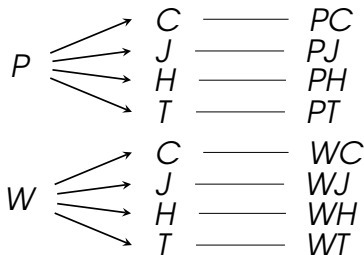


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

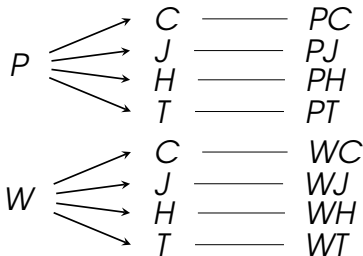


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$



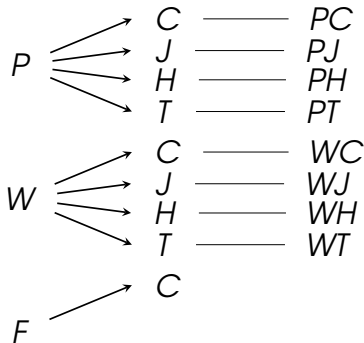
F

Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

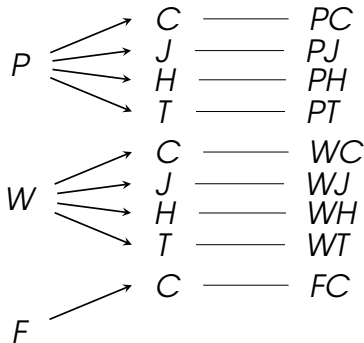


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

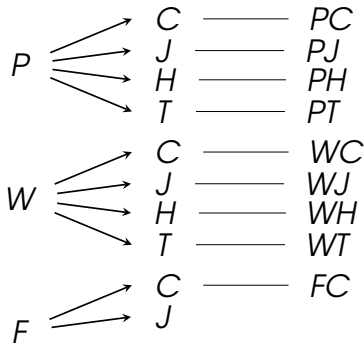


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

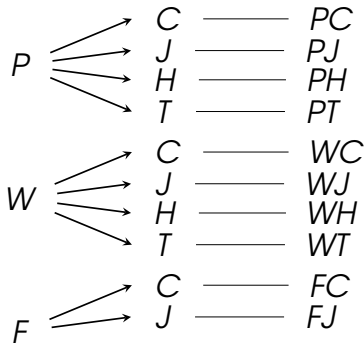


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

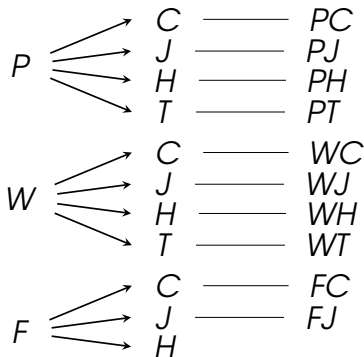


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

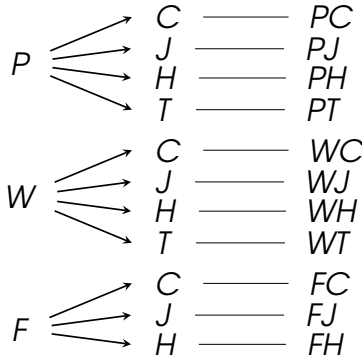


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

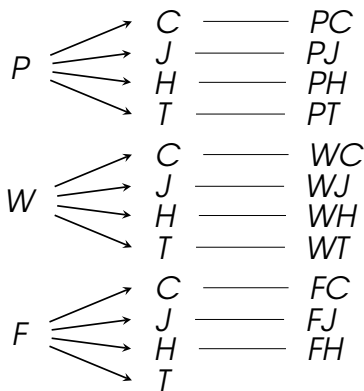


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

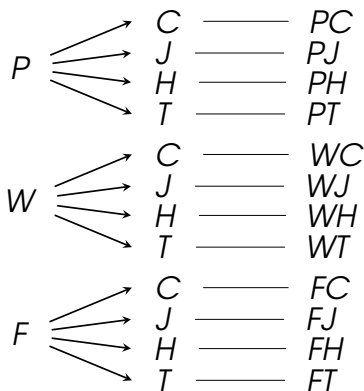


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

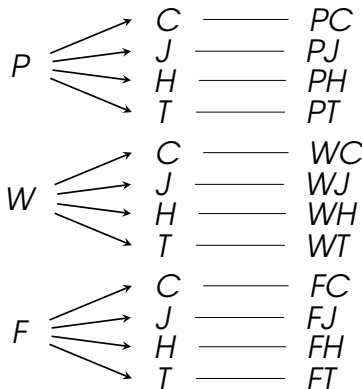


Example 3: Using a Tree Diagram

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$



$$\therefore n(S) = 12$$

Example 3: Using Systematic Listing

Example 3: Using Systematic Listing

Food = 3 ways to choose

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

WT

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

WT

FC

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

WT

FC

FJ

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

WT

FC

FJ

FH

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

WT

FC

FJ

FH

FT

Example 3: Using Systematic Listing

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

PC

PJ

PH

PT

WC

WJ

WH

WT

FC

FJ

FH

FT

$$\therefore n(S) = 12$$

Example 3: Using the Fundamental Counting Principle

Example 3: Using the Fundamental Counting Principle

Food = 3 ways to choose

Example 3: Using the Fundamental Counting Principle

Food = 3 ways to choose

Drink = 4 ways to choose

Example 3: Using the Fundamental Counting Principle

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

Example 3: Using the Fundamental Counting Principle

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

$$n(S) = 3 \times 4$$

Example 3: Using the Fundamental Counting Principle

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

$$n(S) = 3 \times 4$$

$$n(S) = 12$$

Example 3: Using the Fundamental Counting Principle

Food = 3 ways to choose

Drink = 4 ways to choose

$n(S) = ?$

$$n(S) = 3 \times 4$$

$$n(S) = 12$$

\therefore there are 12 different meal choices

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

1. Boys and girls in a family with two children.

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

1. Boys and girls in a family with two children.

$$n(S) = 2 \times 2$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

1. Boys and girls in a family with two children.

$$n(S) = 2 \times 2$$

$$n(S) = 4 \text{ possible outcomes}$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

2. Choosing a 3G or 4G cellphone that comes in black, white, or transparent.

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

2. Choosing a 3G or 4G cellphone that comes in black, white, or transparent.

$$n(S) = 2 \times 3$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

2. Choosing a 3G or 4G cellphone that comes in black, white, or transparent.

$$n(S) = 2 \times 3$$

$$n(S) = 6 \text{ possible outcomes}$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

3. A choice of Spanish, muffin or toast bread with coffee, milk, or juice.

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

3. A choice of Spanish, muffin or toast bread with coffee, milk, or juice.

$$n(S) = 3 \times 3$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

3. A choice of Spanish, muffin or toast bread with coffee, milk, or juice.

$$n(S) = 3 \times 3$$

$$n(S) = 9 \text{ possible outcomes}$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

4. Elias has a choice of a queen or king with a choice of hearts, diamonds, clubs, or spades.

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

4. Elias has a choice of a queen or king with a choice of hearts, diamonds, clubs, or spades.

$$n(S) = 2 \times 4$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

4. Elias has a choice of a queen or king with a choice of hearts, diamonds, clubs, or spades.

$$n(S) = 2 \times 4$$

$$n(S) = 8 \text{ possible outcomes}$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

5. A die is rolled and a coin is tossed.

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

5. A die is rolled and a coin is tossed.

$$n(S) = 6 \times 2$$

Example 4

Find the number of possible outcomes for each scenario using the fundamental counting principle.

5. A die is rolled and a coin is tossed.

$$n(S) = 6 \times 2$$

$$n(S) = 12 \text{ possible outcomes}$$

Example 5

Solve each problem completely.

1. In how many ways can 1 out of 4 blue flags, 1 out of 3 red flags, and 1 out of 2 green flags be arranged on a pole?

Example 5

Solve each problem completely.

1. In how many ways can 1 out of 4 blue flags, 1 out of 3 red flags, and 1 out of 2 green flags be arranged on a pole?

$$n(S) = 4 \times 3 \times 2$$

Example 5

Solve each problem completely.

1. In how many ways can 1 out of 4 blue flags, 1 out of 3 red flags, and 1 out of 2 green flags be arranged on a pole?

$$n(S) = 4 \times 3 \times 2$$

$$n(S) = 24 \text{ ways}$$

Example 5

Solve each problem completely.

2. A lock contains 3 dials, each with ten digits. How many possible sequences of numbers exist?

Example 5

Solve each problem completely.

2. A lock contains 3 dials, each with ten digits. How many possible sequences of numbers exist?

$$n(S) = 10 \times 10 \times 10$$

Example 5

Solve each problem completely.

2. A lock contains 3 dials, each with ten digits. How many possible sequences of numbers exist?

$$n(S) = 10 \times 10 \times 10$$

$$n(S) = 1,000 \text{ possible sequences of numbers}$$

Example 5

Solve each problem completely.

3. Four students are to be chosen from a group of 9 to fill the positions of president, vice-president, treasurer and secretary. In how many ways can this be accomplished?

Example 5

Solve each problem completely.

3. Four students are to be chosen from a group of 9 to fill the positions of president, vice-president, treasurer and secretary. In how many ways can this be accomplished?

$$n(S) = 9 \times 8 \times 7 \times 6$$

Example 5

Solve each problem completely.

3. Four students are to be chosen from a group of 9 to fill the positions of president, vice-president, treasurer and secretary. In how many ways can this be accomplished?

$$n(S) = 9 \times 8 \times 7 \times 6$$

$$n(S) = 3,024 \text{ ways}$$

Example 5

Solve each problem completely.

4. How many 5-number license plates can be made using the digits 0, 1, 2, 3, 4, 5, if repetitions are allowed?

Example 5

Solve each problem completely.

4. How many 5-number license plates can be made using the digits 0, 1, 2, 3, 4, 5, if repetitions are allowed?

$$n(S) = 6 \times 6 \times 6 \times 6 \times 6$$

Example 5

Solve each problem completely.

4. How many 5-number license plates can be made using the digits 0, 1, 2, 3, 4, 5, if repetitions are allowed?

$$n(S) = 6 \times 6 \times 6 \times 6 \times 6$$

$$n(S) = 7,776 \text{ license plates}$$

Example 5

Solve each problem completely.

5. How many 5-number license plates can be made using the digits 0, 1, 2, 3, 4, 5, if repetitions are not allowed?

Example 5

Solve each problem completely.

5. How many 5-number license plates can be made using the digits 0, 1, 2, 3, 4, 5, if repetitions are not allowed?

$$n(S) = 6 \times 5 \times 4 \times 3 \times 2$$

Example 5

Solve each problem completely.

5. How many 5-number license plates can be made using the digits 0, 1, 2, 3, 4, 5, if repetitions are not allowed?

$$n(S) = 6 \times 5 \times 4 \times 3 \times 2$$

$$n(S) = 720 \text{ license plates}$$

**Thank you for attending the
virtual class.**