

Compound Events, Sample Spaces and Simulations

Grade 7 math · Worksheet · Standards: 7.SP.C.8

Name: _____ Date: _____ Class: _____

These 20 problems cover sample spaces for compound events, found with organized lists, tables and tree diagrams, probabilities of compound events, and simulations. Standard 7.SP.C.8 is the focus.

Problems 1 to 7 use small sample spaces. Problems 8 to 14 use sums, replacement and simulations. Problems 15 to 20 are multi-step word problems with larger sample spaces.

Standards: 7.SP.C.8 · **Level:** Grade 7

Problem 1 Two coin flips (easy)

A coin is flipped twice. List the sample space and find the probability of exactly one head.

Problem 2 Outfit choices (easy)

Noah has 3 shirts (red, blue, green) and 2 pairs of pants (jeans, khaki). List all outfits, then find the probability that a random outfit has the blue shirt.

Problem 3 Two spinners (easy)

Spinner A has sections 1, 2, 3 and Spinner B has sections 1, 2. Both are fair. The table shows the sums. Find the probability that the sum is 4.

	B	
	1	2
A		
1	2	3
2	3	4
3	4	5

Sums of the two spinners.

Problem 4 Sum of eight (easy)

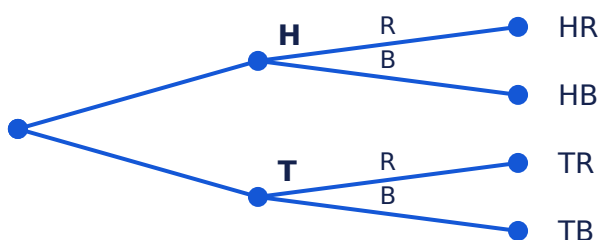
Two number cubes are rolled. Use the table to find $P(\text{sum is } 8)$.

Cube 1	Cube 2					
	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Table for two number cubes.

Problem 5 Coin and spinner tree (easy)

A coin is flipped and a spinner with a red and a blue section of equal size is spun. Use the tree diagram to find $P(\text{tails and red})$.



Tree diagram with four outcomes.

Problem 6 Counting a menu (easy)

A cafe lets customers pick 1 of 4 sandwiches, 1 of 3 drinks and 1 of 2 sides. How many meals are possible? If a meal is picked at random, what is the probability of one particular meal?

Problem 7 At least one head (easy)

A coin is flipped twice. Find the probability of at least one head.

Problem 8 Small sums (medium)

Two number cubes are rolled. Find the probability that the sum is less than 5.

Problem 9 Coin and four-section spinner (medium)

A fair coin is flipped and a fair spinner with sections 1, 2, 3, 4 is spun. Find $P(\text{heads and a number greater than 2})$.

Problem 10 Three coin flips (medium)

A coin is flipped three times. List the sample space and find the probability of exactly two

heads.

Problem 11 Draw with replacement (medium)

A bag holds 3 red marbles (R1, R2, R3) and 2 blue marbles (B1, B2). One marble is drawn, put back, and a second is drawn. Find the probability that both are red.

Problem 12 Draw without replacement (medium)

Use the same bag of 3 red and 2 blue marbles, but this time the first marble is not put back before the second is drawn. Find the probability that both marbles are red.

Problem 13 Family of three (medium)

A coin simulation imitates a family with 3 children: heads means a girl and tails means a boy. Ten trials gave HHT, TTT, HTH, THT, TTH, HHH, TTT, HTT, THH, TTT. Find the experimental probability of at least one girl and compare it with the theoretical probability of $\frac{7}{8}$.

Problem 14 Sums of four-section spinners (medium)

Two fair spinners each have sections 1, 2, 3, 4. The table shows all the sums. Find $P(\text{sum is at least } 7)$.

Spin 1	Spin 2			
	1	2	3	4
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8

Sums of two spinners.

Problem 15 Pizza options (hard)

A pizza shop offers 2 crusts (thin, thick), 3 sizes (small, medium, large) and 2 toppings (cheese, pepperoni). How many different pizzas are possible? A pizza is picked at random. Find $P(\text{thick crust and large})$ and $P(\text{cheese})$.

Problem 16 Two-digit codes (hard)

A bike lock code has two digits, each chosen from 2, 4, 5, 7, 9, and digits may repeat. A code is picked at random. Find $P(\text{both digits are the same})$ and $P(\text{the first digit is greater than the second})$.

Problem 17 Product game (hard)

Two number cubes are rolled in a game. A player wins when the product of the numbers is 12 or

more. Find the probability of winning.

Problem 18 Guessing on a quiz (hard)

A true-false quiz has 3 questions and a student guesses every answer. A simulation uses a coin, where heads means a correct guess. Ten trials were HTH, HHT, TTT, HHH, THH, TTH, HTH, HHT, THT, HHT. Find the experimental probability of exactly two correct answers, the theoretical probability, and explain the difference.

Problem 19 Prime sums (hard)

Spinner 1 has sections 1, 2, 3 and Spinner 2 has sections 1, 2, 3, 4. Both are fair. Find the probability that the sum is a prime number.

Spin 1	Spin 2			
	1	2	3	4
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7

Sums of two spinners.

Problem 20 Restaurant combos (hard)

A sandwich counter builds a lunch from 1 of 3 breads (wheat, rye, white), 1 of 5 fillings (turkey, ham, tuna, egg, hummus) and 1 of 2 cheeses (swiss, cheddar), chosen at random. Find the number of combinations, $P(\text{tuna filling})$ and $P(\text{rye bread with swiss})$.