

Outcome Combo Quest

Count compound outcomes, then turn the count into a probability.

GRADE 7 • 7.SP.C.8a

CCSS.Math.Content.7.SP.C.8a "Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs."

NAME _____

DATE _____

THE BIG IDEA

For a compound event, first find the total number of equally likely outcomes. Then count the outcomes that meet both conditions and write favorable outcomes/total outcomes.

WORKED EXAMPLE

A design app randomly pairs 11 avatar bases with 13 badge symbols. What is the probability of getting the neon base and the comet badge?

1. There are $11 \times 13 = 143$ possible avatar-and-badge pairs.
2. Only 1 pair has both the neon base and the comet badge.
3. Probability = $1/143$.

Answer: 1/143

PRACTICE 6 problems

- 1** A fair coin is flipped and a fair spinner with 8 equal sections numbered 1 through 8 is spun. What is $P(\text{tails and a } 7)$?

ANSWER _____

- 2** Two fair number cubes are rolled. What is $P(\text{the first cube is even and the second cube is greater than } 4)$?

ANSWER _____

- 3** A spinner has 9 equal sections, 2 purple and 7 orange. One card is chosen from 10 cards, 4 with stars and 6 with circles. What is $P(\text{purple and star})$?

ANSWER _____

- 4** Two fair number cubes are rolled. What is $P(\text{the sum is } 8)$?

ANSWER _____

- 5** Three fair coins are flipped. What is $P(\text{exactly two heads})$?

ANSWER _____

- 6** A badge is made by choosing 1 of 4 shapes and 1 of 3 patterns. Each pair is equally likely. What is $P(\text{triangle and striped})$?

ANSWER _____

APPLY IT Show your work

- 1** At an esports club, a game setup is made by randomly choosing 1 of 8 maps and 1 of 3 team colors. What is the probability that the setup uses the Harbor map and the green team color?

WORK SPACE

ANSWER _____

- 2** A profile maker randomly combines 1 of 6 avatar styles with 1 of 5 backgrounds. Two avatar styles are animals, and 3 backgrounds are space scenes. What is the probability of an animal avatar with a space background?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two fair spinners are each labeled 1 through 8. What is the probability that one spinner lands on a multiple of 3 and the other spinner lands on a prime number? Explain how you avoid counting any outcome twice.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A fair coin is flipped and a fair spinner with 8 equal sections numbered 1 through 8 is spun. What is $P(\text{tails and a } 7)$?	$1/16$
2	Two fair number cubes are rolled. What is $P(\text{the first cube is even and the second cube is greater than } 4)$?	$1/6$
3	A spinner has 9 equal sections, 2 purple and 7 orange. One card is chosen from 10 cards, 4 with stars and 6 with circles. What is $P(\text{purple and star})$?	$4/45$
4	Two fair number cubes are rolled. What is $P(\text{the sum is } 8)$?	$5/36$
5	Three fair coins are flipped. What is $P(\text{exactly two heads})$?	$3/8$
6	A badge is made by choosing 1 of 4 shapes and 1 of 3 patterns. Each pair is equally likely. What is $P(\text{triangle and striped})$?	$1/12$

PART 2 • APPLY IT

- $1/24$** There are $8 \times 3 = 24$ equally likely map-and-color setups. Only one setup is Harbor and green, so the probability is $1/24$.
- $1/5$** There are $6 \times 5 = 30$ possible profiles, and $2 \times 3 = 6$ have an animal avatar and a space background. The probability is $6/30$, or $1/5$.

CHALLENGE

$15/64$. There are 8 outcomes where the first spinner is a multiple of 3 and the second is prime, plus 8 reversed outcomes. The outcome (3,3) is in both groups, so subtract it once: $8 + 8 - 1 = 15$ favorable outcomes out of 64.

Accept equivalent fractions, including unsimplified forms such as $6/36$ for problem 2 and $8/90$ for problem 3. For the challenge, students should identify that (3,3) is counted in both groups before subtracting it once.