

Chance and Change

Pair every event with what is not the event.

GRADE 7 • TEKS 7.6.E

7.6.E “find the probabilities of a simple event and its complement and describe the relationship between the two;”

NAME _____

DATE _____

EVENT PARTNERS

For equally likely outcomes, divide the number of favorable outcomes by the total number of outcomes. The complement is every outcome that is not in the event. An event probability and its complement probability always add to 1.

WORKED EXAMPLE

A spinner has 13 equal sections. Six sections show a star. Find $P(\text{star})$ and $P(\text{not star})$.

1. There are 13 total sections.
2. $P(\text{star}) = 6/13$.
3. $P(\text{not star}) = (13 - 6)/13 = 7/13$.
4. Check: $6/13 + 7/13 = 13/13 = 1$.

Answer: $P(\text{star}) = 6/13$; $P(\text{not star}) = 7/13$.

PRACTICE 6 problems

- 1** A game wheel has 8 equal spaces, and 3 spaces say Bonus. Find $P(\text{Bonus})$ and $P(\text{not Bonus})$.

ANSWER _____

- 2** Ten equal cards are numbered 1 through 10. One card is chosen. Find $P(\text{odd number})$ and $P(\text{not odd number})$.

ANSWER _____

- 3** A box has 17 identical charms. Eight are purple and the rest are orange. One charm is chosen at random. Find $P(\text{purple})$ and $P(\text{not purple})$.

ANSWER _____

- 4** The probability that a randomly selected student brings lunch is $1/4$. Find $P(\text{a student does not bring lunch})$.

ANSWER _____

- 5** In a survey of 20 students, 11 choose basketball as their favorite sport. Assume each response is equally likely to be selected. Find $P(\text{basketball})$ and $P(\text{not basketball})$.

ANSWER _____

- 6** A spinner has 18 equal sections. Ten sections are striped. Find $P(\text{striped})$ and $P(\text{not striped})$. Write each probability in simplest form.

ANSWER _____

APPLY IT Show your work

1

At a school esports event, a prize box has 24 keychains. Nine have a game-controller design, and the rest have a lightning design. One keychain is chosen at random. Find $P(\text{game-controller design})$ and $P(\text{not game-controller design})$. Then state how the probabilities are related.

WORK SPACE

ANSWER _____

2

A student has 25 songs in a study playlist. Ten songs are instrumental, and the rest have lyrics. One song is chosen at random. Find $P(\text{instrumental})$ and $P(\text{not instrumental})$. Then state how the probabilities are related.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A sticker pack has 9 holographic stickers and the rest are matte. A sticker is picked at random, and $P(\text{not holographic}) = \frac{2}{3}$. How many stickers are in the pack? Find $P(\text{holographic})$ and explain your reasoning.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A game wheel has 8 equal spaces, and 3 spaces say Bonus. Find $P(\text{Bonus})$ and $P(\text{not Bonus})$.	$P(\text{Bonus}) = 3/8$; $P(\text{not Bonus}) = 5/8$.
2	Ten equal cards are numbered 1 through 10. One card is chosen. Find $P(\text{odd number})$ and $P(\text{not odd number})$.	$P(\text{odd number}) = 1/2$; $P(\text{not odd number}) = 1/2$.
3	A box has 17 identical charms. Eight are purple and the rest are orange. One charm is chosen at random. Find $P(\text{purple})$ and $P(\text{not purple})$.	$P(\text{purple}) = 8/17$; $P(\text{not purple}) = 9/17$.
4	The probability that a randomly selected student brings lunch is $1/4$. Find $P(\text{a student does not bring lunch})$.	$P(\text{a student does not bring lunch}) = 3/4$.
5	In a survey of 20 students, 11 choose basketball as their favorite sport. Assume each response is equally likely to be selected. Find $P(\text{basketball})$ and $P(\text{not basketball})$.	$P(\text{basketball}) = 11/20$; $P(\text{not basketball}) = 9/20$.
6	A spinner has 18 equal sections. Ten sections are striped. Find $P(\text{striped})$ and $P(\text{not striped})$. Write each probability in simplest form.	$P(\text{striped}) = 5/9$; $P(\text{not striped}) = 4/9$.

PART 2 • APPLY IT

- $P(\text{game-controller design}) = 3/8$; $P(\text{not game-controller design}) = 5/8$.** The probabilities add to 1. There are 9 game-controller keychains and 15 other keychains out of 24. The probabilities are $9/24 = 3/8$ and $15/24 = 5/8$, and $3/8 + 5/8 = 1$.
- $P(\text{instrumental}) = 2/5$; $P(\text{not instrumental}) = 3/5$.** The probabilities add to 1. There are 10 instrumental songs and 15 songs with lyrics out of 25. The probabilities are $10/25 = 2/5$ and $15/25 = 3/5$, and $2/5 + 3/5 = 1$.

CHALLENGE

There are 27 stickers in the pack. $P(\text{holographic}) = 1/3$ because $1 - 2/3 = 1/3$, and 9 is $1/3$ of 27.

Accept equivalent fractions unless a problem asks for simplest form. Accept statements such as "they add to 1" or "they make a whole" to describe the relationship between an event and its complement.