Probability of Simple and Compound Events

Explore ideas and representations

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

For equally likely outcomes, $P(E) =$ favorable/total. A complement has probability $1 - P(E)$. For independent events, multiply: a fair coin head and a fair die six has probability $(1/2)(1/6) = 1/12$. Without replacement, counts change after the first draw. For a die, "even or greater than 4 includes $2, 4, 5, 6$; count the overlap only once.

Worked example

Example for form 1: a bag has 3 red and 4 blue counters. Find P(red) on one uniform draw.

1. There are $3 + 4 = 7$ counters in total. The favorable group consists of the 3 red counters, each equally likely to be selected.
2. Divide favorable by total: $P(\text{red}) = 3/7 = \frac{3}{7}$. The remaining counters form the complementary event, blue.
Answer: $P = \frac{3}{7}$

Practice Problems

Show your thinking.

1. A fair six-sided die is rolled. Find $P(\text{even})$.

2. A bag contains 4 red and 6 blue counters. One is selected uniformly. Find $P(\text{not red})$.

3. Two independent fair coins are tossed. Find $P(\text{two heads})$.

4. A fair coin and fair six-sided die are independent. Find $P(\text{head and a multiple of 3})$.

5. An equal-sector spinner has labels 1 through 8. Find $P(\text{less than 4 or even})$.

6. From 3 red and 2 blue counters, draw twice without replacement. Find $P(\text{red then red})$.

7. From 2 green and 3 yellow counters, draw twice with replacement. Find $P(\text{green then yellow})$.

8. Two independent fair coins are tossed. Find $P(\text{at least one head})$.

9. A fair die is rolled. Find $P(\text{a number greater than 6})$.

10. A trial produced 9 successes in 30 attempts. Find the experimental success probability.

Answer Key

1. $P = \frac{1}{2}$
2. $P = \frac{3}{5}$
3. $P = \frac{1}{4}$
4. $P = \frac{1}{6}$
5. $P = \frac{3}{4}$
6. $P = \frac{3}{10}$
7. $P = \frac{6}{25}$
8. $P = \frac{3}{4}$
9. $P = 0$
10. $P = \frac{3}{10}$

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The equally likely outcomes are $1, 2, 3, 4, 5, 6$. The even outcomes are $2, 4, 6$, so the favorable count is 3.

2. Divide favorable by total: $P = 3/6 = 1/2$. Each face has the same chance, so counting faces is valid here.

Problem 2

1. The total is $4 + 6 = 10$ counters. Red has probability $4/10$, so its complement has probability $1 - 4/10$.

2. Thus $P(\text{not red}) = 6/10 = 3/5$. This also equals the blue count divided by all counters, because blue is the only other color.

Problem 3

1. The ordered outcomes are HH, HT, TH, TT, each equally likely. Only HH has two heads, so one of four outcomes qualifies.

2. Therefore $P = 1/4$. Multiplication confirms $(1/2)(1/2) = 1/4$, since the second fair coin does not depend on the first.

Problem 4

1. The die multiples of 3 are $3, 6$, giving probability $2/6$. The coin has head probability $1/2$.

2. Independence allows multiplication: $(1/2)(2/6) = 2/12 = 1/6$. Equivalently, two favorable coin-die pairs occur among twelve equally likely pairs.

Problem 5

1. Less than 4 gives $\{1, 2, 3\}$; even gives $\{2, 4, 6, 8\}$. Their union is $\{1, 2, 3, 4, 6, 8\}$.

2. There are 6 qualifying sectors out of 8, so $P = 6/8 = 3/4$. Sector 2 belongs to both conditions but is counted only once.

Problem 6

1. The first-red chance is $3/5$. After a red is removed, 2 red counters remain among 4, so the second-red chance is $2/4$.

2. Multiply the successive chances: $(3/5)(2/4) = 6/20 = 3/10$. The second denominator decreases because the first counter is not replaced.

Problem 7

1. The green chance is $2/5$. Replacing the first counter restores all 5 counters, so the yellow chance on the second draw is $3/5$.

2. The draws are independent after replacement. Thus $P = (2/5)(3/5) = 6/25$, using the original color counts on both draws.

Problem 8

1. The complement is no heads, namely TT. Its probability is $(1/2)(1/2) = 1/4$.

2. Subtract from one: $1 - 1/4 = 3/4$. The three favorable outcomes are HH, HT, TH; at least one head includes two heads as well.

Problem 9

1. The sample space is $\{1, 2, 3, 4, 5, 6\}$. None of these six outcomes is greater than 6, so the favorable count is 0.

2. The probability is $0/6 = 0$. This event is impossible on the stated die, rather than merely unlikely.

Problem 10

1. Use observed counts, not an assumed fair device: there were 9 successful attempts among 30 trials.

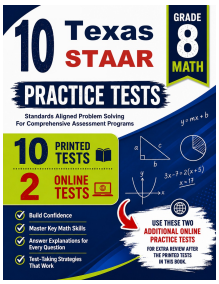
2. The relative frequency is $9/30 = 3/10$. This estimates the chance of success but does not guarantee exactly three successes in every future ten trials.

TESTINAR

Keep Building Grade 8 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 8 books



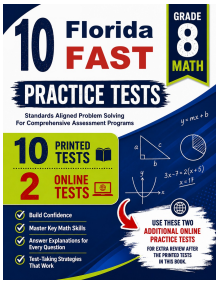
TEXAS STAAR

10 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



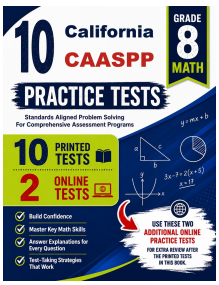
FLORIDA FAST

10 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



CALIFORNIA CAASPP

10 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 8 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/8