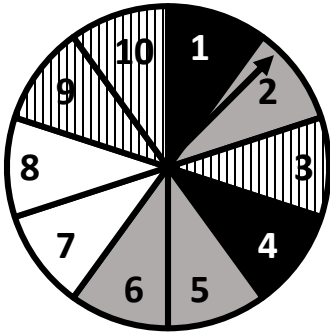


PROBABILITY

Lesson 3 Mixed Probability Practice

Questions 1 – 3 refer to the spinner shown below, with 10 equal sections.



1. What is the probability of the spinner landing on section that is solid black or an even number?

- A. $\frac{7}{10}$ B. $\frac{1}{10}$ C. $\frac{1}{5}$ D. $\frac{3}{5}$ E. $\frac{1}{4}$

2. What is the probability of the spinner landing on a section that is solid gray and an odd number?

- A. $\frac{7}{10}$ B. $\frac{1}{10}$ C. $\frac{4}{5}$ D. $\frac{3}{5}$ E. $\frac{3}{10}$

3. What is the probability of the spinner landing on section that is white with black lines or an even number?

- A. $\frac{7}{10}$ B. $\frac{1}{10}$ C. $\frac{4}{5}$ D. $\frac{3}{5}$ E. $\frac{3}{10}$

4. A jar contains 20 white marbles, 15 black marbles, 10 striped marbles, and 15 green marbles. If the first 2 marbles removed at random, with no replacement, are white and black, what is the probability that the third marble picked will be black?

- A. 25% B. 26% C. 15% D. 14% E. 24%

5. A case of 20 cans of soup has 5 cans of chicken soup. What is the probability of randomly selecting a can of soup that is not chicken?

- A. 25% B. 15% C. 75% D. 4% E. 5%

6. A box of seed packets contains 12 tomato, 15 pepper, 10 carrot, and 14 zucchini packets. What is the probability that a randomly selected packet will be a pepper packet?
A. 0.29 B. 0.41 C. 0.51 D. 0.15 E. 0.25

7. The probability of landing on a blue section on a spinner is 50%. What is the probability of landing on a blue section 4 times in a row?
A. $\frac{1}{8}$ B. $\frac{1}{2}$ C. $\frac{1}{16}$ D. $\frac{1}{20}$ E. $\frac{1}{4}$

8. A bag is filled with gold and silver charms. There are 36 gold charms and the probability that a gold charm will be picked at random from the bag is $\frac{3}{4}$. How many total charms are in the bag?
A. 60 B. 12 C. 48 D. 36 E. 24

Questions 9 – 11 refer to the following table which shows the amount spent on school supplies for a group of students.

Amount Spent	Number of Students
Under \$25	12
\$26 - \$40	18
\$41 – \$55	35
\$56 – \$70	9
\$71 – \$85	8
Over \$85	3

9. If a student is randomly selected what is the probability that the student spent \$71 - \$85 on school supplies?
A. 94% B. 8% C. 9.4% D. 4.9% E. 12.9%
10. If a student is randomly selected, what is the probability that the student spent more than \$55?
A. $\frac{11}{17}$ B. $\frac{4}{17}$ C. $\frac{20}{79}$ D. $\frac{5}{17}$ E. $\frac{1}{4}$
11. If a student is randomly selected, which of the following ranges has the highest probability of including the amount the student spent?
A. \$41 - \$70 B. Over \$70 C. \$41 - \$55 D. Under \$41 E. \$56 - \$85

12. A spinner is divided into 8 even segments numbered 1 – 8. If the first spin lands on 6, and the second spin lands on 6, what is the probability that the third spin will land on 6?

- A. $\frac{1}{16}$ B. $\frac{1}{64}$ C. $\frac{1}{8}$ D. $\frac{1}{4}$ E. $\frac{1}{2}$

13. A spinner is divided into 8 even segments numbered 1 – 8. What is the probability of spinning three 6s in a row?

- A. $\frac{1}{24}$ B. $\frac{1}{64}$ C. $\frac{1}{8}$ D. $\frac{1}{512}$ E. $\frac{1}{4096}$

14. A drawer is filled with black and white socks. There are 30 white socks and the probability of randomly picking a black sock is $\frac{5}{8}$. How many black socks are in the drawer?

- A. 10 B. 50 C. 80 D. 30 E. 36

15. A bag of marbles contains 30 red marbles, 30 blue marbles, 30 white marbles, and 30 black marbles, and a group of 10 game players will be picking marbles at random from the bag. Each person gets 1 pick on the first round of picks, and 2 red, 2 blue, 2 white, and 4 black marbles were chosen. Each person gets 1 pick on the second round of picks, and the first 6 people got 2 red, 2 blue, and 2 black marbles. What is the probability that the next person to pick will get a blue marble?

- A. $\frac{1}{4}$ B. $\frac{3}{10}$ C. $\frac{1}{5}$ D. $\frac{6}{25}$ E. $\frac{1}{6}$

16. A coin has heads on 1 side and tails on the other side. If it is flipped 5 times, what is the probability of it landing on tails all 5 times?

- A. $\frac{1}{10}$ B. $\frac{1}{16}$ C. $\frac{1}{32}$ D. $\frac{1}{2}$ E. $\frac{1}{5}$

17. A teacher is handing out snacks by picking at random from a box that contains 10 bags of potato chips, 15 bags of pretzels, and 12 bags of corn chips. If the first 2 bags she picks are potato chips and corn chips, what is the probability that the next bag she picks will be pretzels?

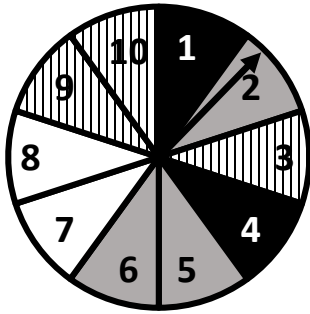
- A. $\frac{15}{37}$ B. $\frac{7}{3}$ C. $\frac{3}{7}$ D. $\frac{2}{7}$ E. $\frac{14}{37}$

18. A game cube has 3 blue sides, 2 white sides, and 1 black side, so the probability of landing on a blue side is 50%. What is the probability of landing on a blue side 3 times in a row?

- A. $\frac{1}{8}$ B. $\frac{1}{2}$ C. $\frac{3}{8}$ D. $\frac{1}{3}$ E. $\frac{1}{6}$

ANSWER KEY Lesson 3 Mixed Probability Practice

Questions 1 – 3 refer to the spinner shown below, with 10 equal sections that are solid black, solid white, solid gray, or striped.



1. What is the probability of the spinner landing on a section that is solid black or an even number?

- A. $\frac{7}{10}$ B. $\frac{1}{10}$ C. $\frac{1}{5}$ D. $\frac{3}{5}$ E. $\frac{1}{4}$

How many of the sections meet the requirement to be solid black or even?

The use of the word “or” means a desired outcome must meet one of the requirements, but doesn’t have to meet both.

The sections numbered 1, 2, 4, 6, 8, and 10 meet one of the requirements.

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{6 \text{ ways to spin solid black or even}}{10 \text{ possible spins}} \rightarrow \frac{6}{10} = \frac{3}{5}$$

Answer: D. $\frac{3}{5}$

CAREFUL – Do not count up all the solid black sections and then all the even sections.

That would give you 2 black plus 5 even for 7 total desired outcomes. This is incorrect because it double counts the sections that are both black and even.

2. What is the probability of the spinner landing on a section that is solid gray and an odd number?

- A. $\frac{7}{10}$ B. $\frac{1}{10}$ C. $\frac{4}{5}$ D. $\frac{3}{5}$ E. $\frac{3}{10}$

How many of the sections meet the requirement to be both solid gray and odd?

The use of the word “and” means a desired outcome must meet both requirements.

The section numbered 5 is the only section that meets both requirements.

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{1 \text{ way to spin solid gray and odd}}{10 \text{ possible spins}} \rightarrow \frac{1}{10}$$

Answer: B. $\frac{1}{10}$

3. What is the probability of the spinner landing on section that is striped or an even number?

- A. $\frac{7}{10}$ B. $\frac{1}{10}$ C. $\frac{4}{5}$ D. $\frac{3}{5}$ E. $\frac{3}{10}$

How many of the sections meet the requirement to be striped or even?

The use of the word “or” means a desired outcome must meet one of the requirements, but doesn’t have to meet both.

The sections numbered 2, 3, 4, 6, 8, 9, and 10 meet one of the requirements.

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{7 \text{ ways to spin striped or even}}{10 \text{ possible spins}} \rightarrow \frac{7}{10}$$

Answer: A. $\frac{7}{10}$

CAREFUL – Do not count up all the striped sections and then all the even sections.

That would give you 3 striped plus 5 even for 8 total desired outcomes. This is incorrect because it double counts the sections that are both striped and even.

4. A jar contains 20 white marbles, 15 black marbles, 10 striped marbles, and 15 green marbles. If the first 2 marbles removed at random, with no replacement, are white and black, what is the probability that the third marble picked will be black?

- A. 25% B. 26% C. 15% D. 14% E. 24%

The term “with no replacement” means that after a marble is removed from the jar it is not put back into the jar.

Before Any Picks

20 white
15 black
10 striped
15 green
60 total

After Picking 1 White and 1 Black

19 white
14 black
10 striped
15 green
58 total

After 1 white marble and 1 black marble are removed, there are now 58 total marbles and 14 black marbles.

$$\frac{\text{desired outcomes}}{\text{total outcomes}} = \frac{14 \text{ black marbles}}{58 \text{ total marbles}} \rightarrow \frac{14}{58} = 14 \div 58 = 0.24 = 24\%$$

Answer: E. 24%

5. A case of 20 cans of soup has 5 cans of chicken soup. What is the probability of randomly selecting a can of soup that is not chicken?

- A. 25% B. 15% C. 75% D. 4% E. 5%

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{15 \text{ not chicken cans}}{20 \text{ total cans}} \rightarrow \frac{15}{20} = 15 \div 20 = 0.75 = 75\%$$

Answer: C. 75%

6. A box of seed packets contains 12 tomato, 15 pepper, 10 carrot, and 14 zucchini packets. What is the probability that a randomly selected packet will be a pepper packet?

- A. 0.29 B. 0.41 C. 0.51 D. 0.15 E. 0.25

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{15 \text{ pepper packets}}{51 \text{ total packets}} \rightarrow \frac{15}{51} = 15 \div 51 = 0.29$$

Answer: A. 0.29

7. The probability of landing on a blue section on a spinner is 50%. What is the probability of landing on a blue section 4 times in a row?

- A. $\frac{1}{8}$ B. $\frac{1}{2}$ C. $\frac{1}{16}$ D. $\frac{1}{20}$ E. $\frac{1}{4}$

The probability of landing on a blue section once is 50%, or $\frac{1}{2}$.

This is independent probability, so to get the probability of landing on blue 4 times in a row, multiply the probability of it happening once 4 times.

$$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16} \quad \text{Answer: C. } \frac{1}{16}$$

8. A bag is filled with gold and silver charms. There are 36 gold charms and the probability that a gold charm will be picked at random from the bag is $\frac{3}{4}$. How many total charms are in the bag?

- A. 60 B. 12 C. 48 D. 36 E. 24

Since the probability of getting gold is $\frac{3}{4}$, think of the bag of charms as divided into 4 equal parts with 3 parts gold.

The problem tells you there are 36 gold charms, so divide the 36 gold charms into 3 gold parts to see how many charms are in 1 part. $36 \div 3 = 12$

If 1 part is 12 charms, then the whole bag, or 4 parts, is $4 \times 12 = 48$ charms.

Answer: C. 48

OR – Set up a proportion. $\frac{\text{gold charms}}{\text{total charms}} = \frac{36}{x} = \frac{3}{4} \quad x = 4 \times 36 \div 3 = 48 \text{ total charms}$

Questions 9 – 11 refer to the following table which shows the amount spent on school supplies for a group of students.

Amount Spent	Number of Students
Under \$25	12
\$26 - \$40	18
\$41 – \$55	35
\$56 – \$70	9
\$71 – \$85	8
Over \$85	3

9. If a student is randomly selected what is the probability that the student spent \$71 – \$85 on school supplies?

- A. 94% B. 8% C. 9.4% D. 4.9% E. 12.9%

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{8 \text{ students spent } \$71-\$85}{85 \text{ total students}} \rightarrow \frac{8}{85} = 8 \div 85 = 0.094 = 9.4\%$$

Answer: C. 9.4%

10. If a student is randomly selected, what is the probability that the student spent more than \$55?

- A. $\frac{11}{17}$ B. $\frac{4}{17}$ C. $\frac{20}{79}$ D. $\frac{5}{17}$ E. $\frac{1}{4}$

$$\frac{\text{desired outcomes}}{\text{total possible outcomes}} = \frac{20 \text{ students spent over } \$55}{85 \text{ total students}} \rightarrow \frac{20}{85} = \frac{4}{17}$$

To get the number of desired outcomes, add together the number of students in every category that is over \$55. The 3 categories at the bottom of the table are all over \$55, so add $9 + 8 + 3 = 20$ to get desired outcomes.

Answer: B. $\frac{4}{17}$

11. If a student is randomly selected, which of the following ranges has the highest probability of including the amount the student spent?

- A. \$41 - \$70 B. Over \$70 C. \$41 - \$55 D. Under \$41 E. \$56 - \$85

The range with the most students will have the highest probability of including the amount spent by the randomly selected student. Calculate the size of each range and select the one with the most students.

- A. \$41 - \$70 44 students ($35 + 9 = 44$)
 B. Over \$70 11 students ($8 + 3$)
 C. \$41 - \$55 35 students
 D. Under \$41 30 students ($18 + 12 = 30$)
 E. \$56 - \$85 17 students ($9 + 8 = 17$)

Answer: A. \$41 - \$70

12. A spinner is divided into 8 even segments numbered 1 – 8. If the first spin lands on 6, and the second spin lands on 6, what is the probability that the third spin will land on 6?

- A. $\frac{1}{16}$ B. $\frac{1}{64}$ C. $\frac{1}{8}$ D. $\frac{1}{4}$ E. $\frac{1}{2}$

Before First Spin	After First Spin	After Second Spin
1 way to spin a 1	1 way to spin a 1	1 way to spin a 1
1 way to spin a 2	1 way to spin a 2	1 way to spin a 2
1 way to spin a 3	1 way to spin a 3	1 way to spin a 3
1 way to spin a 4	1 way to spin a 4	1 way to spin a 4
1 way to spin a 5	1 way to spin a 5	1 way to spin a 5
1 way to spin a 6	1 way to spin a 6	1 way to spin a 6
1 way to spin a 7	1 way to spin a 7	1 way to spin a 7
<u>1 way to spin a 8</u>	<u>1 way to spin a 8</u>	<u>1 way to spin a 8</u>
8 possible outcomes	8 possible outcomes	8 possible outcomes

The desired outcomes and total possible outcomes do not change after each spin. For the third spin, there are still 8 possible outcomes and 1 desired outcome.

$$\frac{\text{desired outcomes}}{\text{total outcomes}} = \frac{1 \text{ way to spin a 6}}{8 \text{ total possible outcomes}} \rightarrow \frac{1}{8}$$

Answer: C. $\frac{1}{8}$

NOTE – We are not calculating the probability of spinning three 6s in a row. The first 2 spins have already happened, and the results are stated in the problem. We are calculating the probability of one thing happening, getting a 6 on the third spin.

13. A spinner is divided into 8 even segments numbered 1 – 8. What is the probability of spinning three 6s in a row?

- A. $\frac{1}{24}$ B. $\frac{1}{64}$ C. $\frac{1}{8}$ D. $\frac{1}{512}$ E. $\frac{1}{4096}$

Calculate the probability of spinning 6 once.

$$\frac{\text{desired outcomes}}{\text{total outcomes}} = \frac{1 \text{ way to spin a 6}}{8 \text{ total possible outcomes}} \rightarrow \frac{1}{8}$$

This is independent probability, so each of the 3 spins has the same probability, $\frac{1}{8}$, of landing on 6.

To get the probability of it happening 3 times in a row, multiply the probability of it happening once 3 times.

$$\frac{1}{8} \times \frac{1}{8} \times \frac{1}{8} = \frac{1}{512}$$

Answer: D. $\frac{1}{512}$

14. A drawer is filled with black and white socks. There are 30 white socks and the probability of randomly picking a black sock is $\frac{5}{8}$. How many black socks are in the drawer?

- A. 10 B. 50 C. 80 D. 30 E. 36

Since the probability of black is $\frac{5}{8}$, think of the socks as divided into 8 equal parts, with 5 parts black. If 5 of the 8 parts are black, then the remaining 3 parts must be white.

The problem tells you there are 30 white socks, so divide the 30 white socks into 3 white parts to see how many socks are in 1 part. $30 \div 3 = 10$

The question asks for black socks, which are 5 parts, or $5 \times 10 = 50$.

Answer: B. 50

OR – Set up a proportion.

$$\frac{\text{black socks}}{\text{white socks}} = \frac{5}{3} = \frac{x}{30} \quad x = 5 \times 30 \div 3 = \mathbf{50 \text{ black socks}}$$

CAREFUL – The problem could have asked for total socks or black socks. Make sure to answer the question being asked, which is the number of black socks, not the number of total socks.

15. A bag of marbles contains 30 red marbles, 30 blue marbles, 30 white marbles, and 30 black marbles, and a group of 10 game players will be picking marbles at random from the bag. Each person gets 1 pick on the first round of picks, and 2 red, 2 blue, 2 white, and 4 black marbles were picked. Each person gets 1 pick on the second round of picks, and the first 6 people got 2 red, 2 blue, and 2 black marbles. What is the probability that the next person to pick will get a blue marble?

- A. $\frac{1}{4}$ B. $\frac{3}{10}$ C. $\frac{1}{5}$ D. $\frac{6}{25}$ E. $\frac{1}{6}$

Before Any Picks	After 10 People Have Had Their First Pick	After 6 People Have Had Their Second Pick
30 red	28 red	26 red
30 blue	28 blue	26 blue
30 white	28 white	28 white
<u>30 black</u>	<u>26 black</u>	<u>24 black</u>
120 total	110 total	104 total

After 6 people have had their second pick, there are now 26 blue and 104 total.

$$\frac{\text{desired outcomes}}{\text{total outcomes}} = \frac{26 \text{ blue}}{104 \text{ total}} \rightarrow \frac{26}{104} = \frac{1}{4}$$

Answer: A. $\frac{1}{4}$

16. A coin has heads on 1 side and tails on the other side. If it is flipped 5 times, what is the probability of it landing on tails all 5 times?

- A. $\frac{1}{10}$ B. $\frac{1}{16}$ C. $\frac{1}{32}$ D. $\frac{1}{2}$ E. $\frac{1}{5}$

Calculate the probability of landing on tails once.

$$\frac{\text{desired outcomes}}{\text{total outcomes}} = \frac{1 \text{ way to get tails}}{2 \text{ total possible outcomes}} = \frac{1}{2}$$

This is independent probability, so to get the probability of landing on tails 5 times in a row, multiply the probability of it happening once 5 times.

$$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{32}$$

Answer: C. $\frac{1}{32}$

17. A teacher is handing out snacks by picking at random from a box that contains 10 bags of potato chips, 15 bags of pretzels, and 12 bags of corn chips. If the first 2 bags she picks are potato chips and corn chips, what is the probability that the next bag she picks will be pretzels?

- A. $\frac{15}{37}$ B. $\frac{7}{3}$ C. $\frac{3}{7}$ D. $\frac{2}{7}$ E. $\frac{14}{37}$

After 1 potato chip and 1 corn chip are removed, there are now 35 total bags and there are still 15 pretzels.

$$\frac{\text{desired outcomes}}{\text{total outcomes}} = \frac{15 \text{ pretzels}}{35 \text{ total}} \rightarrow \frac{15}{35} = \frac{3}{7} \quad \text{Answer: C. } \frac{3}{7}$$

18. A game cube has 3 blue sides, 2 white sides, and 1 black side, so the probability of landing on a blue side is 50%. What is the probability of landing on a blue side 3 times in a row?

- A. $\frac{1}{8}$ B. $\frac{1}{2}$ C. $\frac{3}{8}$ D. $\frac{1}{3}$ E. $\frac{1}{6}$

The probability of landing on a blue side once is 50%, or $\frac{1}{2}$.

This is independent probability, so to get the probability of landing on blue 3 times in a row, multiply the probability of it happening once 3 times.

$$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$$

Answer: A. $\frac{1}{8}$