

Name _____

Date _____

Worksheet A3 : Single Event Probability

One of these names is to be drawn from a hat. Determine each probability below:

Mary Jenny Bob Marilyn Bill Jack Jerry Tina Connie Joe

1. $P(3\text{-letter name}) = \frac{21}{105}$ or _____ (What is the probability of drawing a 3-letter name?)

2. $P(4\text{-letter name}) =$ _____ 3. $P(\text{name starting with B}) =$ _____

4. $P(\text{name starting with T}) =$ _____ 5. $P(7\text{-letter name}) =$ _____

6. $P(\text{name starting with S}) =$ _____ 7. $P(\text{name ending with Y}) =$ _____

One of these cards will be drawn without looking.



8. $P(2) = \frac{1}{12}$ *number of twos*
total number of cards

9. $P(5) =$ _____

10. $P(J) =$ _____

11. $P(\text{a number}) =$ _____

12. $P(4) =$ _____

13. $P(T) =$ _____

14. $P(\text{a letter}) =$ _____

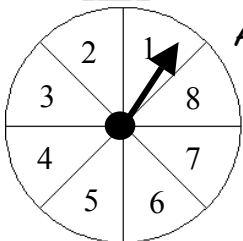
One card is drawn from a well-shuffled deck of 52 cards. What is the probability of drawing...

15. $P(\text{ace}) =$ _____

16. $P(\text{face card - K, J, Q}) =$ _____

17. $P(\text{a red 10}) =$ _____

18. $P(\text{NOT a diamond}) =$ _____



A spinner, numbered 1-8, is spun once. What is the probability of spinning...

19. an EVEN number? _____

20. a multiple of 3? _____

21. a PRIME number? _____

22. 9? _____

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Worksheet B3 : Complementary Events Inclusive vs. Mutually Exclusive Events

For any event A , $P(A) + P(A') =$ _____, that is $P(A') =$ _____ - $P(A)$.

1. Suppose that an event A has probability of $\frac{3}{8}$. What is $P(A')$? _____
2. Suppose that the probability of snow is 0.58, What is the probability that it will NOT snow? _____

If A and B are mutually exclusive events, then $P(A \text{ or } B) = P(A) + P(B)$.

and

If A and B are inclusive events, then $P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$.

A card is chosen from a well-shuffled deck of 52 cards.

What is the probability that the card will be:

3. a king OR a queen? _____
4. a red jack OR a black king? _____
5. a face card OR a card with a prime number? _____
6. an even card OR a red card? _____
7. a spade or a jack? _____

A spinner number 1-10 is spun. Each number is equally likely to be spun.

What is the probability of spinning:

8. an even number OR a power of three? _____

9. an odd number OR a power of three? _____

10. a number less than 8 OR a divisor of 15? _____

11. Look at the solution to the following problem and see if you can find the error (there definitely is a mistake). Correct the error to find the right answer.

$$P(\text{drawing an ace OR a black card}) = P(\text{ace}) + P(\text{black}) = \frac{4}{52} + \frac{26}{52} = \frac{30}{52} = \frac{15}{26}$$

Which of the problems above are about:

(write the problem number under its type)

COMPLEMENTARY events?

INCLUSIVE events?

MUTUALLY-EXCLUSIVE events?

GO back and check to see if you used the correct formula for each problem, based on its type. Make any changes necessary.

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Worksheet C3 : Independent vs. Dependent Events

Independent events

1. Bag A contains 9 red marbles and 3 green marbles. Bag B contains 9 black marbles and 6 orange marbles. Find the probability of selecting one green marble from bag A and one black marble from bag B.
2. Two seniors, one from each government class are randomly selected to travel to Washington, D.C. Wes is in a class of 18 students and Maureen is in a class of 20 students. Find the probability that both Wes and Maureen will be selected.
3. If there was only one government class, and Wes and Maureen were in that class of 38 students, what would be the probability that both Wes and Maureen would be selected as the two students to go to Washington? Is this still an example of independent events?

Dependent Events

4. A box contains 5 purple marbles, 3 green marbles, and 2 orange marbles. Two consecutive draws are made from the box **without replacement** of the first draw. Find the probability of each event.
 - a. P(orange first, green second)
 - b. P(both marbles are purple)
 - c. P(the first marble is purple, and the second is ANY color EXCEPT purple)
5. If you draw two cards from a standard deck of 52 cards **without replacement**, find:
 - a. P(King first, Jack second)
 - b. P(face card first, ace second)
 - c. P(2 aces)

MULTIPLE CHOICE:

6. A coin is tossed and a die with numbers 1-6 is rolled. What is $P(\text{heads and } 3)$?
- a. $1/12$ b. $1/4$ c. $1/3$ d. $2/3$
7. Two cards are selected from a deck of cards numbered 1 - 10. Once a card is selected, it is not replaced. What is $P(\text{two even numbers})$?
- a. $1/4$ b. $2/9$ c. $1/2$ d. 1
8. Which of the following is NOT an example of independent events?
- a. rolling a die and spinning a spinner
b. tossing a coin two times
c. picking two cards from a deck with replacement of first card
d. selecting two marbles one at a time without replacement
9. A club has 25 members, 20 boys and 5 girls. Two members are selected at random to serve as president and vice president. What is the probability that both will be girls?
- a. $1/5$ b. $1/25$ c. $1/30$ d. $1/4$
10. One marble is randomly drawn and then replaced from a jar containing two white marbles and one black marble. A second marble is drawn. What is the probability of drawing a white and then a black?
- a. $1/3$ b. $2/9$ c. $3/8$ d. $1/6$
11. Maria rolls a pair of dice. What is the probability that she obtains a sum that is either a multiple of 3 OR a multiple of 4?
- a. $5/9$ b. $7/12$ c. $1/36$ d. $7/36$
12. Events A and B are independent. The $P(A) = 3/5$, and $P(\text{not } B) = 2/3$. What is $P(A \text{ and } B)$?
- a. $2/5$ b. $1/5$ c. $4/15$ d. $2/15$

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Worksheet D3 : Probability vs. Odds

The probability of an event is defined as the number of ways the event can happen successfully divided by the number of ways it can possibly happen (successes + failures).

The odds in favor of an event are defined as the number of ways the event can happen successfully divided by the number of ways it can fail to happen.

If the odds in favor of an event are $\frac{a}{b}$, or a to b ,

then the probability of the event is $\frac{a}{a+b}$,

and the odds against an event are $\frac{b}{a}$, or b to a ,

A single die is tossed.

1. What is the probability that the number of spots showing is:

- a. 6 b. even c. odd d. less than 3?

2. What are the odds that the number of spots showing is:

- a. 6 b. even c. odd d. less than 3?

3. One letter is selected at random from the first 10 letters of the alphabet. What is the probability that the letter is:

- a. a vowel b. a consonant
c. before E in the alphabet d. in the word SIDEWALK

4. What are the odds in favor of each event in #3?

- a. a vowel b. a consonant
c. before E in the alphabet d. in the word SIDEWALK

5. Two dice are thrown. Refer to the 2 die roll chart to the right to decide the probability of each of the following events.

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

- a. The sum of the numbers showing is 7.
- b. Both dice show the same number.
- c. The dice show different numbers.
- d. The sum of the numbers showing is 4 or 6.

6. What are the odds in favor of each event in #5?

- a. The sum of the numbers showing is 7.
- b. Both dice show the same number.
- c. The dice show different numbers.
- d. The sum of the numbers showing is 4 or 6.

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Worksheet E3 : Review for Unit 3 Test

The spinner shown is spun once. For each problem, find:

- the probability of each event,
- the odds in favor of each event.

Give your answers as **reduced fractions**.

1. The number is odd.

2. The spinner lands on white.

3. The number is 6 **or** red.

4. The number has a factor of 3 **or** not white.

5. A bag contains 8 red marbles, 12 blue marbles, and 17 green marbles. If one marble is randomly selected from the bag, what is the probability that the marble is red **or** green?

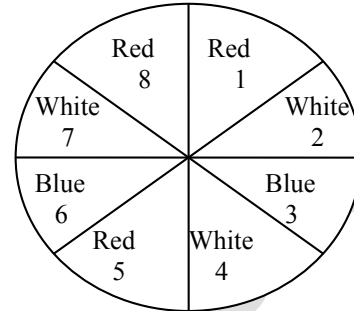
- a. $\frac{8}{17}$ b. $\frac{25}{12}$ c. $\frac{25}{37}$ d. $\frac{20}{37}$ e. $\frac{29}{37}$

6. A circular spinner is divided into 5 equal parts. If the spinner is spun 3 times, what is the probability that an even number is spun all 3 times? (*Think of each spin as a separate event.*)

- a. $\frac{6}{15}$ b. $\frac{23}{10}$ c. $\frac{6}{25}$ d. $\frac{8}{125}$

7. If you cannot be on the soccer team and the football team at the same time, that is an example of a(n) _____ event.

- a. theoretical b. complementary c. mutually exclusive d. inclusive



Questions 8 – 13 refer to a bag that contains 6 blue marbles, 7 green marbles, and 3 red marbles. (Show your answers as **reduced fractions or percents to the nearest tenth.**) Example: $\frac{1}{8} = 12.5\%$

- _____ 8. What is the probability of selecting a red marble?
- _____ 9. What is the probability of selecting a red **or** a green marble?
- _____ 10. If the probability of selecting a blue marble is $\frac{3}{8}$, what is the probability of not selecting a blue marble?
- _____ 11. What is the probability of selecting a green marble, **replacing that marble, and** then selecting a blue marble?
- _____ 12. What is the probability of selecting a green marble, **without replacement, and** then selecting a blue marble?
- _____ 13. What is the probability of selecting a blue marble **and** then selecting another blue marble **without replacement**?

Theoretical vs. Experimental Probability

A coin is tossed. What is the theoretical probability of

14. Heads _____ 15. Tails _____

The coin is tossed 20 times with the results at the right. Using these results, what is the experimental probability of

16. Heads _____ 17. Tails _____

Results	
H	H
H	H
T	T
T	T
T	T
T	T
H	H
H	H
H	H
H	H

Questions 22-24 refer to a six-sided die with the numbers 1 through 6. (Show answers as **reduced fractions.**)

- _____ 22. What is the probability of rolling an odd number?
- _____ 23. What is the probability of rolling a multiple of 5?

_____ 24. What is the probability of rolling an even number **or** a factor of 4? Show work.
Determine if the following scenarios are **independent** or **dependent**.

_____ 25. Flipping a coin 3 times.

_____ 26. In a group of 20 students, what is the probability that 2 people have the same birthday?

_____ 27. Selecting a marble from a bag, not replacing it, and then selecting another marble from the bag.

A card is drawn from a standard 52-card deck. Tell whether the events A and B are inclusive or mutually exclusive. Then find $P(A \text{ or } B)$.

28. A: The card is red.
B: The card is a 4.

29. A: The card is a face card.
B: The card is a club.

30. A: The card is black.
B: The card is red.

31. A: The card is less than 10.
B: The card is a red face card.

32. A: The card is red.
B: The card is not a diamond or a heart.

Are there any questions you need to ask your teacher?

Do you know all the formulas?