Pre-Algebra: Week of April 13 – 17, 2020

Time Allotment: 40 minutes per day

Student Name: ________________________________

Teacher Name: ________________________________

Academic Honesty

I certify that I completed this assignment independently in accordance with the GHNO Academy Honor Code.

Student signature:

____

I certify that my student completed this assignment independently in accordance with the GHNO Academy Honor Code.

Parent signature:

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Pre-Algebra: Chapter 11 Probability
April 13 – April 17

Packet Overview

Date	Objective(s)	Page Number
Monday, April 13	***Holiday***	2
Tuesday, April 14	Evaluate mutually exclusive event problems and Intro to Overlapping events.	2
Wednesday, April 15	Calculate the probability of the intersection of two events. More practice problems	5
Thursday, April 16	Calculate the probability of the intersection of two events. More practice problems	5
Friday – April 17	Estimating Probabilities ***Quiz***	7

Additional Notes: Thank you students for all your hard work and commitment to Pre-Algebra.

Email: Patrick.Franzese@greatheartsnorthernoaks.org or Melisa.Walters@greatheartsnorthernoaks.org

Each lesson essentially directly tracks the textbook. So, as part of each lesson, students are encouraged to review the corresponding unit in the textbook for additional explanation and examples

Also, each lesson will end with a set of math problems pertaining to that particular lesson of the day.

Please create an "Exercise Packet" which is to include all your work and completion of these daily exercises. Each day is to have a title with the date followed by the name of the lesson. Please include a title page and staple all the completed exercises. **At a later point, we will ask you to turn your exercise packet. Do not worry right now about whether that will be online or in person, simply do the problem set as I instruct with the proper titles and labels.**

Zoom "Office Hours" are off to a great start! As a reminder, this means during the designated times below you can contact us to ask questions, go over problems etc… For example, if you had Pre-Algebra with Mrs. Walters during Period 5, then on Tuesday and Thursday from 11-11:50 you can connect with her via Zoom. More details to follow on specific links, access codes and etiquette. Note, however, you can email at any time!! We appreciate all of you. Have a great week!

	Monday	Tuesday	Wednesday	Thursday
10-10:50	Period 1	Period 4	Period 1	Period 4
11-11:50	Period 2	Period 5	Period 2	Period 5
11:50-1	Break			
1-1:50	Period 3	Period 6	Period 3	Period 6

Pre-Algebra: Chapter 11 Probability
April 13 – April 17

Monday, April 13
HOLIDAY

Tuesday, April 14
Pre-Algebra: Chapter 11
Lesson: Dependent Events (Lesson 11-8)

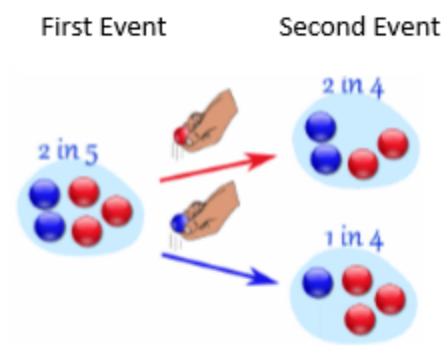
Objective: Determine if two events are mutually exclusive, overlapping, independent, or dependent.
Calculate the probability of the union of two events.

Lesson Recap:
This lesson completes the sequence of four lessons regarding the probabilities of a multiplicity of events. In this lesson, we consider the probabilities of two events both occurring, where the probability of one changes based on the outcome of the other. This is known as ***conditional probability*** based on **dependent events**.

Example: Dependent Event Activity

Dependent Event: The result of the first draw affects the result of the second draw.

Example: removing colored marbles from a bag. Each time you remove a marble the chances of drawing out a certain color will change.



Look to the right. The P(Red) = $\frac{3}{5}$ and P(Blue) = $\frac{2}{5}$
If Red is selected and not replaced, then when drawing the second marble, the P(Red) = $\frac{2}{4}$ and P(Blue) = $\frac{2}{4}$
If Blue is selected and not replaced, then when drawing the second marble, the P(Red) = $\frac{3}{4}$ and P(Blue) = $\frac{1}{4}$

KEY WORDS: "without replacement"
Means "dependent event" and the denominators will change

Now, we will look at the probability of two events, when the probability of the second event depends on the probability of the 1st even happening!

Formula:

"Probability Of" "Given"

$$P(A \text{ and } B) = P(A) \times P(B \mid A)$$

Event A Event B

Example:

A bag contains 2 red and 3 blue marbles. A marble is drawn and is not replaced. A second marble is drawn.

Find the probability of these events.

a. The first marble is red, and the second one is blue.
b. The first marble is blue, and the second one is red.
c. Both marbles are red.
d. Both marbles are blue.
e. They are different colors.

Solution:

Determine the individual probabilities first.

$P(\text{red}) = \frac{2}{5}$ $\qquad P(\text{blue}) = \frac{3}{5}$

$P(\text{blue} \mid \text{red}) = \frac{3}{4}$ $\qquad P(\text{red} \mid \text{blue}) = \frac{2}{4} = \frac{1}{2}$

$P(\text{red} \mid \text{red}) = \frac{1}{4}$ $\qquad P(\text{blue} \mid \text{blue}) = \frac{2}{4} = \frac{1}{2}$

Why does P(red | red) = $\frac{1}{4}$
Because you start with 5 marbles, two of which are red. If you take out a red one, then there are only 4 marbles left, only 1 of which is red. Thus, the probability of drawing a red marble, after first drawing a red marble and not replacing it is $\frac{1}{4}$!

Then, once you have the individual probabilities, use them in the formula:

a. $P(\text{red, then blue}) = P(\text{red}) \times P(\text{blue} \mid \text{red}) = \frac{2}{5} \times \frac{3}{4} = \frac{3}{10}$

b. $P(\text{blue, then red}) = P(\text{blue}) \times P(\text{red} \mid \text{blue}) = \frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$

c. $P(\text{red, red}) = P(\text{red}) \times P(\text{red} \mid \text{red}) = \frac{2}{5} \times \frac{1}{4} = \frac{1}{10}$

d. $P(\text{blue, blue}) = P(\text{blue}) \times P(\text{blue} \mid \text{blue}) = \frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$

e. $P(\text{different colors}) = P(\text{red, then blue}) + P(\text{blue, then red})$

$$= \frac{3}{10} + \frac{3}{10} = \frac{3}{5}$$

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Try It Practice Problems:

There are 3 red, 1 blue, and 2 yellow marbles in a bag. Once a marble is selected, it is **not** replaced. Determine each probability.

2. P(red and then yellow)

3. P(blue and then yellow)

4. P(red and then blue)

5. P(two yellow marbles)

<u>Please check your answers before moving to the next part!</u>

Two socks are drawn from a drawer which contains one red sock, three blue socks, two black socks, and two green socks. Once a sock is selected, it is **not** replaced. Determine each probability.

1. P(a black sock and then a green sock)

2. P(two blue socks)

3. P(a green sock and then a red sock)

4. P(two green socks)

<u>Please check your answers before beginning your homework!</u>

Any questions right now?
Please email: Patrick.Franzese@greatheartsnorthernoaks.org or Melisa.Walters@greatheartsnorthernoaks.org

Exercises for Tuesday April 14, 2020
Written Exercises pp. 426-427, 1-15 odd

Wednesday, April 15, 2020 and Thursday, April 16, 2020

Pre-Algebra: Chapter 11
Lesson: More Practice

Objective: Determine if two events are mutually exclusive, overlapping, independent, or dependent.
Calculate the probability of the union of two events.

Lesson

We have covered a lot of material over the past three weeks and the next two lessons present an opportunity to ensure you have learned, and hopefully mastered, the concepts we studied. Specifically, you need to complete both the Extra practice, pages 522 and 523, over the next 2 days: Wednesday and Thursday. You can find the problems in your textbook or below.

Extra Practice: Chapter 11

Find the value of each.

1. $6!$
2. $3!$
3. $10!$
4. $2!$
5. $5!$
6. ${}_2P_2$
7. ${}_4P_4$
8. ${}_9P_3$
9. ${}_{15}P_2$
10. ${}_{28}P_4$
11. An auto dealer has 3 models on sale. Each is available in 5 colors, with or without air-conditioning. How many different cars are available?
12. In how many different ways can you arrange the letters in the word DIRECT if you take the letters 3 at a time?

Find the value of each.

13. ${}_4C_2$
14. ${}_{10}C_3$
15. ${}_6C_3$
16. ${}_{12}C_2$
17. ${}_{10}C_5$
18. How many combinations of 3 fish can you choose from 7 fish?
19. There are 52 basketball teams entered in a tournament. How many combinations can make it to the final game?

A bag contains 3 green, 2 blue, 1 red, and 1 white marble. Find the probability for a marble chosen at random.

20. P(red)
21. P(white)
22. P(not red)
23. P(green)
24. P(not green)
25. P(yellow)
26. P(not yellow)
27. P(green or red)
28. P(red, white, or green)

Kate has 24 albums: 4 by the Deltas, 6 by the Squares, 6 by the Tuscon Band, 3 by Eliot Smith, 3 by the Marks, and 2 by the Deep River Quartet. She selects one at random.

29. Find the odds in favor of selecting a record by the following.
    a. the Marks   b. the Deep River Quartet   c. the Squares
30. Find the odds against selecting a record by the following.
    a. Eliot Smith   b. the Tuscon Band   c. the Squares

Two game cubes are rolled. Find the probability of each.

31. a. The cubes show the same number.
    b. The sum is 3.
    c. The cubes show the same number or the sum is 3.
32. a. The difference is 1.
    b. The sum is 12.
    c. The difference is 1 or the sum is 12.

522 *Extra Practice*

33. $P(A) = 0.40$, $P(B) = 0.60$, $P(A \text{ and } B) = 0.24$. Find $P(A \text{ or } B)$.

34. Find the probability that a month, chosen at random, begins with the letter J or has 30 days.

35. $P(A) = 0.25$, $P(B) = 0.20$, $P(A \text{ and } B) = 0.05$. Find $P(A \text{ or } B)$.

36. Two game cubes are rolled. Find the probability of each event.
    a. The cubes show the same number.
    b. The sum is 8.
    c. The cubes show the same number and the sum is 8.
    d. The cubes show the same number or the sum is 8.

Are A and B independent events? If they are, find $P(A \text{ and } B)$.

37. A white game cube and a red game cube are rolled.
    A: An even number comes up on the white cube.
    B: A 2 comes up on the red cube.

38. A bag contains 4 green marbles and 3 white marbles. A marble is drawn at random and replaced. Then a marble is drawn again.
    A: The first marble is green.
    B: The second marble is white.

A bag contains 3 dimes, 4 nickels, and 5 pennies. One of the coins is drawn at random and is not replaced. Then a second coin is drawn. Find the probability of the events described.

39. Both coins are dimes.

40. The first coin is a nickel and the second is a penny.

41. The first coin is a nickel and the second is a dime.

42. Both coins are nickels.

A bag contains 26 cards, each with a different letter of the alphabet. One card is drawn and is not replaced. Then another card is drawn. Find the probability of the events. Assume y is a vowel.

43. Two vowels are drawn.

44. Two consonants are drawn.

45. George has had 52 hits in 125 times at bat. Estimate the probability that George will get a hit on his next time at bat.

46. An inspector on an assembly line chose 200 condensers at random out of 4000 condensers. Of the 200, 6 were defective.
    a. What is the probability that a condenser will be defective?
    b. About how many defective condensers would you expect to find in the 4000 condensers?

Extra Practice 523

Any questions right now?
Please email: Patrick.Franzese@greatheartsnorthernoaks.org or Melisa.Walters@greatheartsnorthernoaks.org

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Friday, April 17, 2020

Pre-Algebra: chapter 11
Lesson: Estimating Probabilities (Lesson 11-9)

Objective: Use probabilities to estimate future outcomes based on past experiences

****NOTE: First, please complete the quiz located at the end of the packet. Then, you may begin this lesson.*

Lesson:
In this unit so far, we have used probabilities to describe the likelihood of an outcome when we are given all possible outcomes. In today's lesson, we are use probabilities to describe the likelihood of an outcome when we are either given the prior history of an event or a random sample of an event. We will start today with an overview of what random sample means.

Overview
What does random mean?

- **Random** means lacking any definite plan or order or purpose; governed by or depending on chance.

What is a sample?

- A **sample** is a small part of something intended as representative of the whole.
- **Samples** are the smaller part of a population that you will study when doing a survey or an experiment.

What are random samples?

- **Random samples** are samples in which every element in the population has an equal chance of being selected.
- **Random samples** are grabbed at random (i.e., from a hat).
- **Random samples** are samples in which every member of the universe has an equal chance of being chosen.

Why is Random Sampling important?

- Random sampling eliminates bias by giving all individuals an equal chance to be chosen

Random Samples

- In probability/statistical terms a **random sample** is a set of items that have been drawn from a population in such a way that each time an item was selected, every item in the population had an equal opportunity to appear in the sample. In practical terms, it is not so easy to draw a random sample.

- First, the only factor operating when a given item is selected, must be chance.

- Second, in order to meet the equal opportunity requirement, it is important that the sampling be done without replacement (names are not put back in the hat.)

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Purpose of Random Sampling

- You can then draw conclusions about how the entire population would respond based on the responses from this randomly selected group of people.

Summary

- In random sampling, each item or element of the population has an equal chance of being chosen at each draw.
- A sample is random if the method for obtaining the sample meets the criterion of randomness (each element having an equal chance at each draw).
- The actual composition of the sample itself does not determine whether or not it was a random sample.

Experiments such as drawing a card or rolling a game cube are of a special kind. We know all of the possible outcomes and are able to assign an equal probability to each. In many real-life situations, however, we can only estimate probabilities based on experience.

EXAMPLE 1 Up to now Mark has sunk 75 out of 120 free throws. Find the probability that he will succeed in sinking the next free throw he attempts.

Solution We use "past history" to estimate the probability.

$$P(\text{success}) = \frac{\text{number of past successes}}{\text{number of past attempts}} = \frac{75}{120} = \frac{5}{8} = 0.625$$

We say that Mark's *free-throw average* is 0.625.

Often we can use **sampling methods** to estimate probabilities. In such cases, a sample is chosen at random and conclusions are drawn based on an analysis of the sample.

Often we can use **sampling methods** to estimate probabilities. In such cases, a sample is chosen at random and conclusions are drawn based on an analysis of the sample.

EXAMPLE 2 A factory turns out 5000 digital calculators a day. To control quality, a daily random sample of 200 is taken and tested. Of these, 6 are found to be defective.

a. Find the probability that a randomly chosen calculator will be defective.

b. How many calculators in a day's output are likely to be defective?

Solution **a.** We assume that the random sample is representative of the day's output.

$$P(\text{defective}) = \frac{\text{number defective in a sample}}{\text{number in sample}} = \frac{6}{200} = 0.03$$

b. It is possible that only 6 of the entire output of 5000 calculators are defective, but this is very unlikely. We assume that the following proportion is close to the actual situation:

$$\frac{\text{number defective}}{\text{total number}} = \frac{\text{number defective in sample}}{\text{number in sample}}$$

Thus, $$\frac{\text{number defective}}{5000} = 0.03$$

$$\text{number defective} = 0.03 \times 5000 = 150$$

In a day's output, 150 calculators are likely to be defective.

Note that a random sample was specified in Example 2. If the sample were not random, the information obtained from the sample would not be as reliable. For instance, if the sample consisted of the first 200 calculators made that day, the results could be biased by machinery that needed adjustment.

In general, the larger the size of a random sample, the more reliable it is. But the reliability of a large sample must be balanced against the cost and time involved in taking it.

Exercises for Friday, April 17, 2020
Pg 429, Class Exercises # 1, 3, 5
Pg 429, Problems #1-6

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ANSWER KEY

Try it answers for Tuesday, April 14, 2020

2. P(red and then yellow)

P(red) $\frac{3}{6} = \frac{1}{2}$ P(yellow) $\frac{2}{5}$

$\frac{1}{2} \times \frac{2}{5}$ $\frac{2 \div 2}{10 \div 2} = \boxed{\frac{1}{5}}$

3. P(blue and then yellow)

P(blue) $\frac{1}{6}$ P(yellow) $\frac{2}{5}$

$\frac{1}{6} \times \frac{2}{5}$ $\frac{2 \div 2}{30 \div 2} = \boxed{\frac{1}{15}}$

4. P(red and then blue)

P(red) $\frac{1}{2}$ P(blue) $\frac{1}{5}$ $= \boxed{\frac{1}{10}}$

5. P(two yellow marbles)

P(yellow) $\frac{2}{6} = \frac{1}{3}$ P(yellow) $\frac{2}{5}$

$\frac{1}{3} \times \frac{2}{5} = \boxed{\frac{2}{15}}$

Two socks are drawn from a drawer which contains one red sock, three blue socks, two black socks, and two green socks. Once a sock is selected, it is **not** replaced. Determine each probability.

8 total socks

1. P(a black sock and then a green sock)

P(black) $\frac{2}{8} = \frac{1}{4}$ P(green) $\frac{2}{7}$

$\frac{1}{4} \times \frac{2}{7} = \frac{2 \div 2}{28 \div 2} = \boxed{\frac{1}{14}}$

2. P(two blue socks)

P(blue) $\frac{3}{8}$ P(blue) $\frac{2}{7}$

$\frac{3}{8} \times \frac{2}{7} = \frac{6}{56} \frac{\div 2}{\div 2} \boxed{\frac{3}{28}}$

3. P(a green sock and then a red sock)

P(green) $\frac{2}{8} = \frac{1}{4}$ P(red) $\frac{1}{7}$

$\frac{1}{4} \times \frac{1}{7} = \boxed{\frac{1}{28}}$

4. P(two green socks)

P(green) $\frac{2}{8} = \frac{1}{4}$ P(green) $\frac{1}{7}$

$\boxed{\frac{1}{28}}$

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Answers to Exercises for Tuesday, April 14, 2020
Written Exercises pp. 426-427, 1-15 odd

Pages 426-427 • WRITTEN EXERCISES

A 1. a. First event: A red marble is drawn. Second event: A red marble is drawn.

b. $P(\text{red} \mid \text{red}) = \frac{3}{9} = \frac{1}{3}$

2. a. First event: A blue marble is drawn. Second event: A blue marble is drawn.

b. $P(\text{blue} \mid \text{blue}) = \frac{5}{9}$

3. a. First event: A blue marble is drawn. Second event: A red marble is drawn.

b. $P(\text{red} \mid \text{blue}) = \frac{4}{9}$

4. a. First event: A red marble is drawn. Second event: A blue marble is drawn.

b. $P(\text{blue} \mid \text{red}) = \frac{6}{9} = \frac{2}{3}$

5. $P(\text{orange, orange}) = P(\text{orange}) \times P(\text{orange} \mid \text{orange}) = \frac{3}{10} \times \frac{2}{9} = \frac{1}{15}$

6. $P(\text{green, green}) = P(\text{green}) \times P(\text{green} \mid \text{green}) = \frac{7}{10} \times \frac{6}{9} = \frac{7}{15}$

7. $P(\text{orange, then green}) = P(\text{orange}) \times P(\text{green} \mid \text{orange}) = \frac{3}{10} \times \frac{7}{9} = \frac{7}{30}$

8. $P(\text{green, then orange}) = P(\text{green}) \times P(\text{orange} \mid \text{green}) = \frac{7}{10} \times \frac{3}{9} = \frac{7}{30}$

9. $P(\text{different colors}) = P(\text{green, then orange}) + P(\text{orange, then green}) = \frac{7}{30} + \frac{7}{30} = \frac{7}{15}$

B 10. ways of drawing 2 yellow $= {}_6C_2 = \frac{6 \times 5}{2 \times 1} = 15$; ways of drawing any 2 $= {}_{11}C_2 = \frac{11 \times 10}{2 \times 1} = 55$; $P(\text{yellow, yellow}) = \frac{15}{55} = \frac{3}{11}$

11. ways of drawing 2 red $= {}_5C_2 = \frac{5 \times 4}{2 \times 1} = 10$; ways of drawing any 2 $= {}_{11}C_2 = \frac{11 \times 10}{2 \times 1} = 55$; $P(\text{red, red}) = \frac{10}{55} = \frac{2}{11}$

12. ways of drawing 1 yellow $= {}_6C_1 = 6$; ways of drawing 1 red $= {}_5C_1 = 5$; ways of drawing any 2 $= {}_{11}C_2 = \frac{11 \times 10}{2 \times 1} = 55$; $P(\text{different colors}) = \frac{6(5)}{55} = \frac{6}{11}$

13. $P(\text{odd, odd}) = \frac{3}{5} \times \frac{2}{4} = \frac{3}{10}$

14. $P(\text{even, even}) = \frac{2}{5} \times \frac{1}{4} = \frac{1}{10}$

15. $P(\text{even, then odd}) + P(\text{odd, then even}) = \frac{2}{5} \times \frac{3}{4} + \frac{3}{5} \times \frac{2}{4} = \frac{3}{10} + \frac{3}{10} = \frac{3}{5}$

Answers to Exercises for Wednesday, April 15, 2020 and Thursday, April 16, 2020

Pages 522–523 • CHAPTER 11

1. $6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$
2. $3! = 3 \times 2 \times 1 = 6$
3. $10! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 3{,}628{,}800$
4. $2! = 2 \times 1 = 2$
5. $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$
6. ${}_2P_2 = 2 \times 1 = 2$
7. ${}_4P_4 = 4 \times 3 \times 2 \times 1 = 24$
8. ${}_9P_3 = 9 \times 8 \times 7 = 504$
9. ${}_{15}P_2 = 15 \times 14 = 210$
10. ${}_{28}P_4 = 28 \times 27 \times 26 \times 25 = 491{,}400$
11. $3 \times 5 \times 2 = 30$; 30 different cars are available.
12. ${}_6P_3 = 6 \times 5 \times 4 = 120$; you can arrange the letters 120 different ways.
13. ${}_4C_2 = \frac{{}_4P_2}{{}_2P_2} = \frac{4 \times 3}{2 \times 1} = 6$
14. ${}_{10}C_3 = \frac{{}_{10}P_3}{{}_3P_3} = \frac{10 \times 9 \times 8}{3 \times 2 \times 1} = 120$
15. ${}_6C_3 = \frac{{}_6P_3}{{}_3P_3} = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$
16. ${}_{12}C_2 = \frac{{}_{12}P_2}{{}_2P_2} = \frac{12 \times 11}{2 \times 1} = 66$
17. ${}_{10}C_5 = \frac{{}_{10}P_5}{{}_5P_5} = \frac{10 \times 9 \times 8 \times 7 \times 6}{5 \times 4 \times 3 \times 2 \times 1} = 252$
18. ${}_7C_3 = \frac{7 \times 6 \times 5}{3 \times 2 \times 1} = 35$; you can choose 35 combinations.
19. ${}_{52}C_2 = \frac{52 \times 51}{2 \times 1} = 1326$; 1326 combinations can make it.

20. $P(\text{red}) = \frac{1}{7}$ **21.** $P(\text{white}) = \frac{1}{7}$ **22.** $P(\text{not red}) = \frac{6}{7}$

23. $P(\text{green}) = \frac{3}{7}$ **24.** $P(\text{not green}) = \frac{4}{7}$ **25.** $P(\text{yellow}) = \frac{0}{7} = 0$

26. $P(\text{not yellow}) = \frac{7}{7} = 1$ **27.** $P(\text{green or red}) = \frac{4}{7}$ **28.** $P(\text{red, white, or green}) = \frac{5}{7}$

29. a. $P(\text{Marks}) = \frac{3}{24} = \frac{1}{8}$; odds in favor $= \dfrac{\frac{1}{8}}{1 - \frac{1}{8}} = \dfrac{\frac{1}{8}}{\frac{7}{8}} = \frac{1}{7}$; 1 to 7

b. $P(\text{Deep River}) = \frac{2}{24} = \frac{1}{12}$; odds in favor $= \dfrac{\frac{1}{12}}{1 - \frac{1}{12}} = \dfrac{\frac{1}{12}}{\frac{11}{12}} = \frac{1}{11}$; 1 to 11

c. $P(\text{Squares}) = \frac{6}{24} = \frac{1}{4}$; odds in favor $= \dfrac{\frac{1}{4}}{1 - \frac{1}{4}} = \dfrac{\frac{1}{4}}{\frac{3}{4}} = \frac{1}{3}$; 1 to 3

30. a. $P(\text{Smith}) = \frac{3}{24} = \frac{1}{8}$; odds against $= \dfrac{1 - \frac{1}{8}}{\frac{1}{8}} = \dfrac{\frac{7}{8}}{\frac{1}{8}} = \frac{7}{1}$; 7 to 1

b. $P(\text{Tuscon}) = \frac{6}{24} = \frac{1}{4}$; odds against $= \dfrac{1 - \frac{1}{4}}{\frac{1}{4}} = \dfrac{\frac{3}{4}}{\frac{1}{4}} = \frac{3}{1}$; 3 to 1

c. $P(\text{Squares}) = \frac{6}{24} = \frac{1}{4}$; odds against $= \dfrac{1 - \frac{1}{4}}{\frac{1}{4}} = \dfrac{\frac{3}{4}}{\frac{1}{4}} = \frac{3}{1}$; 3 to 1

31. a. $P(\text{same number}) = \frac{6}{36} = \frac{1}{6}$

b. $P(\text{sum} = 3) = \frac{2}{36} = \frac{1}{18}$

c. $P(\text{same number or sum} = 3) = \frac{1}{6} + \frac{1}{18} = \frac{4}{18} = \frac{2}{9}$

32. a. $P(\text{difference} = 1) = \frac{10}{36} = \frac{5}{18}$

b. $P(\text{sum} = 12) = \frac{1}{36}$

c. $P(\text{difference} = 1 \text{ or sum} = 12) = \frac{5}{18} + \frac{1}{36} = \frac{11}{36}$

33. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = 0.40 + 0.60 - 0.24 = 0.76$

34. $P(\text{J or 30 days}) = P(\text{J}) + P(\text{30 days}) - P(\text{J and 30 days}) = \frac{3}{12} + \frac{4}{12} - \frac{1}{12} = \frac{6}{12} = \frac{1}{2}$

35. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = 0.25 + 0.20 - 0.05 = 0.40$

36. a. $P(\text{same number}) = \frac{6}{36} = \frac{1}{6}$

b. $P(\text{sum} = 8) = \frac{5}{36}$

c. $P(\text{same number and sum} = 8) = \frac{1}{36}$

d. $P(\text{same number or sum} = 8) = \frac{1}{6} + \frac{5}{36} - \frac{1}{36} = \frac{10}{36} = \frac{5}{18}$

37. Yes, A and B are independent events. $P(A \text{ and } B) = P(A) \times P(B) = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$

38. Yes, A and B are independent events. $P(A \text{ and } B) = P(A) \times P(B) = \frac{4}{7} \times \frac{3}{7} = \frac{12}{49}$

39. $P(\text{dime, dime}) = \frac{3}{12} \times \frac{2}{11} = \frac{1}{22}$

40. $P(\text{nickel, penny}) = \frac{4}{12} \times \frac{5}{11} = \frac{5}{33}$

41. $P(\text{nickel, dime}) = \frac{4}{12} \times \frac{3}{11} = \frac{1}{11}$

42. $P(\text{nickel, nickel}) = \frac{4}{12} \times \frac{3}{11} = \frac{1}{11}$

43. $P(\text{vowel, vowel}) = \frac{6}{26} \times \frac{5}{25} = \frac{3}{65}$

44. $P(\text{consonant, consonant}) = \frac{20}{26} \times \frac{19}{25} = \frac{38}{65}$

45. $P(\text{hit}) = \frac{52}{125} = 0.416$

46. a. $P(\text{defective}) = \frac{6}{200} = 0.03$

b. $\frac{\text{number defective}}{4000} = 0.03$, number defective $= 0.03(4000) = 120$; there would be 120 defective condensers.

Answers to Exercises for Friday, April 17, 2020
Pg 429, Class Exercises # 1, 3, 5
Pg 429, Problems #1-6

Page 429 • CLASS EXERCISES

1. $P(\text{hit}) = \frac{9}{30} = \frac{3}{10} = 0.3$
2. $P(\text{success}) = \frac{18}{25} = \frac{72}{100} = 0.72$
3. $P(\text{snow}) = \frac{15}{50} = \frac{3}{10} = 0.3$
4. $P(\text{completion}) = \frac{9}{15} = \frac{3}{5} = 0.6$
5. $P(\text{correct}) = \frac{990}{1000} = \frac{99}{100} = 0.99$

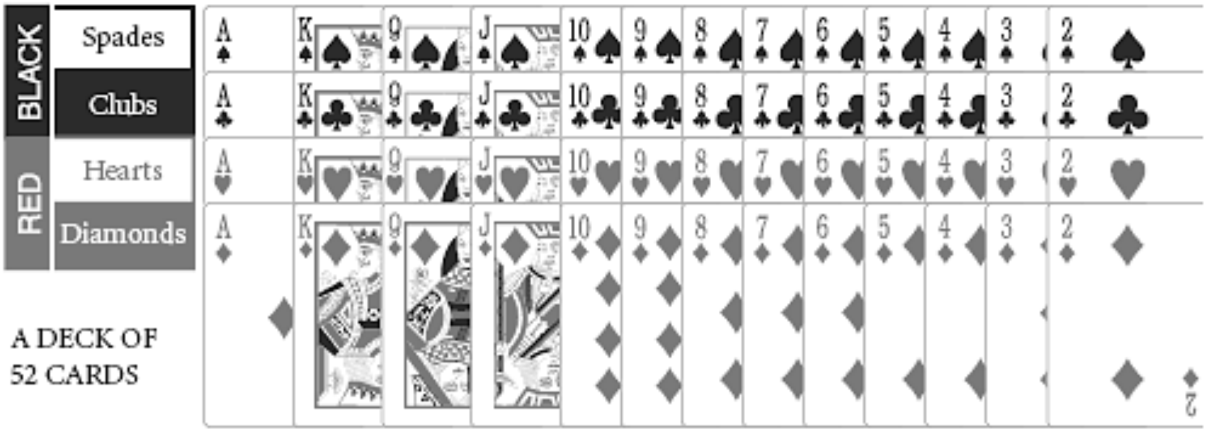
Pages 429-431 • PROBLEMS

A

1. $P(\text{green}) = \frac{16}{50} = 0.32$
2. $P(\text{white}) = \frac{23}{50} = 0.46$
3. $P(\text{yellow}) = \frac{11}{50} = 0.22$
4. $P(\text{white or yellow}) = \frac{34}{50} = 0.68$
5. $P(\text{yellow or green}) = \frac{27}{50} = 0.54$
6. $P(\text{green or white}) = \frac{39}{50} = 0.78$
7. $\frac{\text{number white}}{1000} = 0.46$, number white $= 0.46(1000) = 460$; there are about 460 white balls.
8. $\frac{\text{number yellow}}{1000} = 0.22$, number yellow $= 0.22(1000) = 220$; there are about 220 yellow balls.

PROBABILITY QUIZ

The picture below shows the possible cards that could be chosen from a standard pack of playing cards. You may use this picture to answer **Questions #6-9**



1. One card is drawn at random. What is the probability of choosing a black ace or any red **number** less than 8. *Write the appropriate probability equation first.*

2. One card is drawn at random and **then replaced.** Then a second card is drawn. What is the probability of choosing a 2 of clubs on the first drawn and king on the second draw. *Write the appropriate probability equation first.*

3. Describe the situations that would correspond to the equations.

$$P(\text{King or Queen}) = P(\text{King}) + P(\text{Queen}) - P(\text{King and Queen})$$

$$P(\text{King and Queen}) = P(\text{King}) \cdot P(\text{Queen}|\text{King})$$

4. One card is drawn at random and **then put aside.** Then a second card is drawn. What is the probability of choosing a Jack on the first draw and any number 10 on the second draw.