GreatHearts®

Pre-Algebra: Week of April 6 – 10, 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:

____

Pre-Algebra: Chapter 11 Probability
April 6 – April 10

GreatHearts®

Packet Overview

Date	Objective(s)	Page Number
Monday, April 6	Mutually exclusive events - Determine if two events are mutually exclusive, overlapping, independent, or dependent.	2
Tuesday, April 7	Evaluate mutually exclusive event problems and Intro to Overlapping events.	5
Wednesday, April 8	Overlapping Events - Calculate the probability of the union of two events.	7
Thursday, April 9	Calculate the probability of the intersection of two events.	9
Friday – April 10	***Holiday***	

Additional Notes: Thank you students for all of 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.**

And starting this week we will now have "Office Hours" via Zoom! 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 6 – April 10

GreatHearts®

Monday, April 6

Pre-Algebra: Chapter 11
Lesson: Mutually exclusive events

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

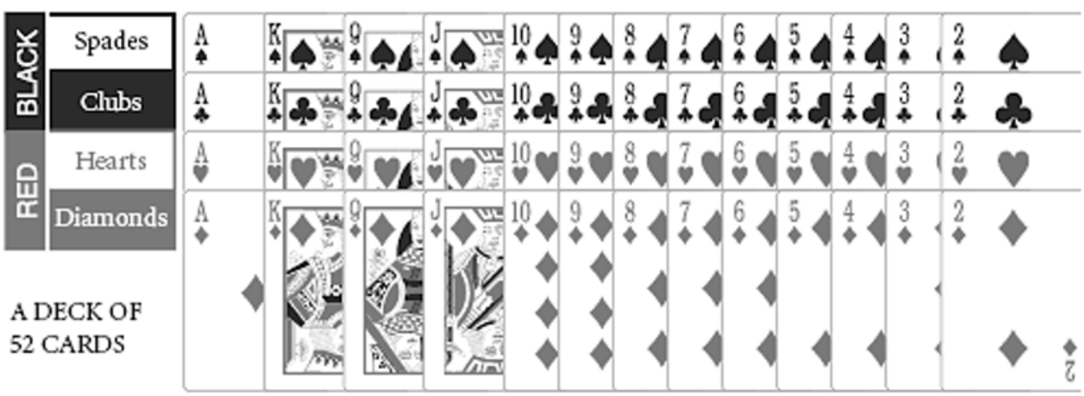
Preparing for this section:
Before getting started, you can review probability that we have learned thus far: (ctrl key + Click on link)
https://www.khanacademy.org/math/ap-statistics/probability-ap/randomness-probability-simulation/v/basic-probability

Mutually Exclusive Events

Today's lesson we will be discussing mutually exclusive events. Two events that cannot occur together are called mutually exclusive events. In other words, if you have two events that happen at the same time, then they are not mutually exclusive events. For example, imagine if you were asked to choose one number between 1-20. You cannot select both "7" and "13" at the same time. So choosing number 7 and choosing number 13 would be mutually exclusive.

Please click on this video for a more in-depth explanation of what it means to be mutually exclusive.
https://www.youtube.com/watch?v=SQLAWVkFk4E (ctrl key + Click on link at the same time to open up)

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 any questions.



Your turn:
Activity 1: Could the two events (A and B) in the following situations happen at the same time? Write yes or no in the box to the right of each example.

1) Event A: toss a coin and get "heads."
   Event B: toss a coin and get "tails."

2) Event A: roll a dice and get a "1."
   Event B: roll a dice and get a "6."

3) Event A: roll a dice and get a “2”.
   Event B: roll a dice and get an even number.

4) A bag contains 2 yellow balls and 3 blue balls. A single ball is drawn from it.
   Event A: You get a yellow ball.
   Event B: You get a blue ball.

5) One student is selected as the class president.
   Event A: John is selected as the class president.
   Event B: Peter is selected as the class president.

6) A single card is drawn from a deck of standard playing cards.
   Event A: A spade is drawn.
   Event B: A heart is drawn.

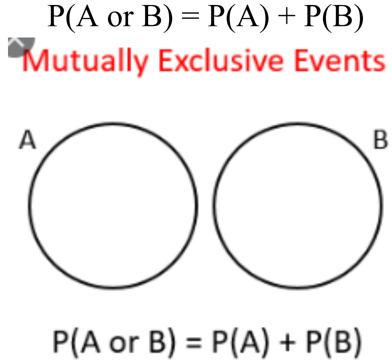
7) A single card is drawn from a deck of standard playing cards.
   Event A: A heart is drawn.
   Event B: A king is drawn.

In everyday life, there are events that cannot happen at the same time. We call these Mutually Exclusive Events. If you answered “no” to any question above, then the events were mutually exclusive.

***PLEASE check your answers before proceeding to the next section.

Probability of Mutually Exclusive Events
If two events A and B are mutually exclusive, then the probability that A or B will occur is the sum of the probabilities of the events. That means you should add!

$$P(A \text{ or } B) = P(A) + P(B)$$



Let's do an example together using a deck of cards.

Example 1: You randomly choose a card from a standard deck of 52 playing cards. What is the probability of choosing a King or a Queen?

A = King B = Queen

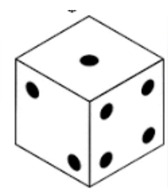
P(A or B) = P(A) + P(B)

$= \frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \boxed{\frac{2}{13}}$

Since the probability of drawing a King and drawing a Queen are mutually exclusive, we add the probability of drawing a King (4/52) plus the probability of drawing a Queen (4/52) to get (2/13)!

Your turn:
Activity 2: Find the Probability of Event A <u>or</u> Event B!

1. Roll a single standard die.



Event A: Roll the die and get a "1".
Event B: Roll the die and get a "4".

P(A) = ________ P(B) = ________

The probability of getting a "1" or a "4", $P(A\ or\ B)$ is _________.

2. Spin the following wheel one time.

Event A: You win a calendar.
Event B: You win cash.

P(A) = ________ P(B) = ________

The probability of getting a calendar or cash, $P(A\ or\ B)$ is ______.

***Probability sample with replacement means I reach into the jar and pull out a marble, then the marble is put back into the jar before the next marble is pulled out of the jar. For a video demonstration of this (which will help with problem 3!) watch the following: https://www.youtube.com/watch?v=dQ9r2S7NWLs

3. There are five marbles of different colors in a bag: orange, yellow, red, blue, and white. Draw a single marble from the bag. (with replacement)

Event A: Draw a white marble.

This means what is the probability that I reach in the bag and pull out a white marble? P(A) = $\frac{total\ number\ of\ white}{total\ number\ of\ marbles}$ = __________

Event B: Draw an orange marble.

P(B) = ________

The probability of getting a white or an orange marble, $P(A\ or\ B)$ is __________.

***PLEASE check your answers before proceeding to the next section.

Exercises for Monday, April 6, 2020
"Written Exercises" pp. 414-415, 1-17 odd.
Any questions right now?
Please email: Patrick.Franzese@greatheartsnorthernoaks.org or Melisa.Walters@greatheartsnorthernoaks.org

Tuesday, April 7th

Pre-Algebra: Chapter 11
Lesson: Mutually Exclusive and Overlapping Events

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

Lesson Recap: Mutually Exclusive events. In yesterday's lesson, we expanded our understanding of probability by considering the probability that one of several mutually exclusive events occur. This lesson relies heavily on the students intuitive understanding of the probability of an event occurring as the fraction of times that event occurs out of all possible events. In this case, because the events are independent, the fraction of events that contains either one or the other of them is the sum of the fraction of events that contains each of them.

Let's do more practice problems on mutually exclusive events. After completion of these practice problems, please check the answer key before moving on to the next lesson.

4. There are 52 cards in a standard deck of playing cards. Draw a single card.

Event A: Draw the King of Spades
Event B: Draw an Ace.

P(A) = ________ P(B) = ________
The probability of getting the King of Spades or an Ace, $P(A\ or\ B)$ is __________.

Think Tank Questions:

5. In each example from Activity 2 from yesterday, events A and B were ______________________________.

6. State the relationship between $P(A)$, $P(B)$, and $P(A\ or\ B)$.

$P\ (A\ or\ B) =$ ____________ + ____________.

7. Your class is electing a new president. The probability of John becoming the class president is 0.2 and the probability of Jenny becoming the class president is 0.4. What is the probability of either John or Jenny becoming the class president?

***PLEASE check your answers before proceeding to the next section.

Overlapping Events

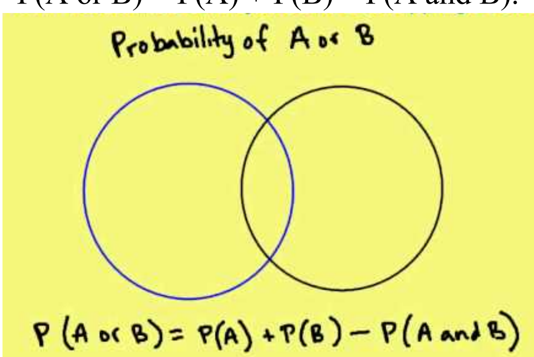
"Overlapping Events" do occur at the same time. You will need to add and subtract! When working on problems that involve overlapping events, the events will be defined first, for example, an event A and an event B. Many times event A can happen by itself and also happen with event B. It is "overlapping" when both event A and event B are happening at the same time.

Please click on this video for a more in-depth explanation of Overlapping Events.
https://www.youtube.com/watch?v=cB_9FqmXql0

Mathematically, this is what it means:

If two events A and B are overlapping, then the probability that A or B will occur is the sum of the probabilities of each event minus the intersection of the two events. That means you should add and then subtract the probability of both events happening at the same time.

P(A or B) = P(A) + P(B) – P(A and B).



In Mathematics *or* means "and/or".
A *or* B means A occurs, or B occurs, or both A and B occur.
A *and* B means that *both* A and B must occur.

Let's examples together.

Example 2: You randomly choose a card from a standard deck of 52 playing cards. What is the probability of choosing a heart or a two? A = Heart B = Two

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$P(A \text{ or } B) = \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \boxed{\frac{4}{13}}$

Example 3: On Monday in Mr. Pearson's class, 12 girls and 15 boys completed their math homework. There are 14 girls and 16 boys in the class. If a student is randomly chosen, what is the probability of choosing a girl or a student who completed their homework?

A = Girl B = student who completed their homework

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$P(A \text{ or } B) = \frac{14}{30} + \frac{27}{30} - \frac{12}{30} = \boxed{\frac{29}{30}}$

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

Exercises for Tuesday April 7, 2020
Pg 417 Class Exercises #1, 4 ,5, 6

Wednesday, April 8

Pre-Algebra: Chapter 11
Lesson: Overlapping Events

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

Lesson 3
So far this week, we have considered the probability that one of several mutually exclusive events occurs. In yesterday's lesson, we extended this to overlapping events. Recall, events are overlapping when the qualities of each outcome are not necessarily mutually exclusive, such as if the roll of a dice is even or a multiple of three. Today, we do some brief review on basic probability concepts and then proceed to more problems on overlapping events.

Let's apply our notes to the practice problems below.

COMPUTE….

1) Derrick's teacher will select one student from his homewroom to take a letter to the main office. There are 13 girl in the class, and 17 boys in the class. Find the probability of the following get selected to take the letter:

   a. P(girl)____________
   b. P(boy)____________
   c. P(Derrick)____________
   d. P(not Derrick)____________

2) A computer will randomly select one day out of the week. Find each:

   a. P(Monday)____________
   b. P(Weekend)____________
   c. P(Weekday)____________

Justify….

1.) Jane spins the spinner below. She says that the probability of landing on the section labeled "4" is 25% or ¼. Explain why she is incorrect.

***PLEASE check your answers before proceeding to the next section.

Exercises for April 8, 2020:
"Written Exercises" pp. 418, 1-13 odd.

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

Thursday, April 9

Pre-Algebra: chapter 11
Lesson: Independent Events

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

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

Lesson

This lesson is the third of a sequence of four lessons on the probability of the combination of events. In the first two lessons (11-5 and 11-6), we considered the probability that either one or another event occurs. In this lesson and the next, we consider the probability that both events occur. Later, the first will be called the probability of the union of two events and the second will be called the probability of the intersection of two events.

An example:
A coin is tossed and a game cube rolled. Consider these events.
A: The coin shows heads
B: The cube shows 2, 3, 4, or 6
Neither of these events has any effect on the other.
For example, the probability that B will occur is NOT affected by whether or not A occurs.
Such events are said to be **independent**.

Probability of Independent Events

When two events, A and B, are independent the probability of both occurring is:

P(A and B) = P(A) x P(B)

Please watch this video: https://www.youtube.com/watch?v=7QlZjoLmg3I (3 mins)

https://www.youtube.com/watch?v=CjeXRuZs1XI (2 mins)

https://www.youtube.com/watch?v=oAl16hKAgKQ (3 mins)

NOTES: If A and B are independent events, then

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

***And means that both events happening together!

Independent Events are **not affected** by previous events.

This is an important idea!

A coin does not "know" it came up heads before.

And each toss of a coin is a perfectly isolated event.

Example: You toss a coin and it comes up "Heads" three times ... what is the chance that the next toss will also be a "Head"?

Answer: The chance is simply ½ (or 0.5) just like ANY toss of the coin.

<u>Two or More Events</u>
We can calculate the chances of two or more **independent** events by **multiplying** the chances.
Example: Probability of 3 Heads in a Row

For each toss of a coin a Head has a probability of 0.5:

H
0.5

H H
$0.5 \times 0.5 = 0.25$ (or $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$)

H H H
$0.5 \times 0.5 \times 0.5 = 0.125$ (or $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$)

And so the chance of getting 3 Heads in a row is **0.125**

<u>ANOTHER EXAMPLE:</u>

Example: The chance of a flight being delayed is 0.2 (=20%), what are the chances of no delays on a round trip?

The chance of a flight **not** having a delay is $1 - 0.2 =$ **0.8**, so these are all the possible outcomes:

$0.8 \times 0.8 =$ **0.64** chance of **no delays**
$0.2 \times 0.8 =$ **0.16** chance of only the1st flight being delayed
$0.8 \times 0.2 =$ **0.16** chance of only the return flight being delayed
$0.2 \times 0.2 =$ **0.04** chance of both flights being delayed

When we add all the possibilities we get: $0.64 + 0.16 + 0.16 + 0.04 =$ **1.0**

Since there are only four possible outcomes, when you add the probability of each outcome together, they all add to 1.0! This is is a good way of checking our calculations.

Result: 0.64, or a 64% chance of no delays

Your turn to Try It!
Class Exercises: page 421 # 1 – 6 odds

***PLEASE check your answers before proceeding to the homework.

Exercise for Thursday, April 9, 2020

"Written Exercises" pp. 422-423, 1-13 odd.

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

Friday, April 10, 2020
Holiday

GreatHearts®

ANSWER KEY

Try it Exercise Monday, April 6, 2020

Activity 1:

Could the two events (A and B) in the following situations happen at the **same time**? Write yes or no in the box to the right of each example.

1) Event A: toss a coin and get "heads."
   Event B: toss a coin and get "tails." NO

2) Event A: roll a dice and get a "1."
   Event B: roll a dice and get a "6." NO

3) Event A: roll a dice and get a "2".
   Event B: roll a dice and get an even number. Yes

4) A bag contains 2 yellow balls and 3 blue balls. A single ball is drawn from it.
   Event A: You get a yellow ball.
   Event B: You get a blue ball. NO

5) One student is selected as the class president.
   Event A: John is selected as the class president.
   Event B: Peter is selected as the class president. NO

6) A single card is drawn from a deck of standard playing cards.
   Event A: A spade is drawn.
   Event B: A heart is drawn. NO

7) A single card is drawn from a deck of standard playing cards.
   Event A: A heart is drawn.
   Event B: A king is drawn. Yes

Activity 2:

1. Roll a single standard die.

   Event A: Roll the die and get a "1".
   Event B: Roll the die and get a "4".

   P(A) = 1/6 P(B) = 1/6

   The probability of getting a "1" or a "4", $P(A \text{ or } B)$ is 1/3.

2. Spin the following wheel one time.

   Event A: You win a calendar.
   Event B: You win cash.

   P(A) = 1/4 P(B) = 1/4

   The probability of getting a calendar or cash, $P(A \text{ or } B)$ is 1/2.

3. There are five marbles of different colors in a bag: orange, yellow, red, blue, and white. Draw a single marble from the bag.

   Event A: Draw a white marble.
   Event B: Draw an orange marble.

   P(A) = 1/5 P(B) = 1/5

   The probability of getting a white or an orange marble, $P(A \text{ or } B)$ is 2/5.

Exercises for Monday, April 6, 2020

Written Exercises" pp. 414-415, 1-17 odd.

Pages 414–415 • WRITTEN EXERCISES

A 1. $P(A \text{ or } B) = P(A) + P(B) = \frac{1}{5} + \frac{2}{3} = \frac{3}{15} + \frac{10}{15} = \frac{13}{15}$

2. $P(A \text{ or } B) = P(A) + P(B) = 0.32 + 0.45 = 0.77$

3. $P(A \text{ or } B) = P(A) + P(B)$, $0.7 = 0.4 + P(B)$, $P(B) = 0.3$

4. $P(A \text{ or } B) = P(A) + P(B)$, $\frac{3}{4} = P(A) + \frac{1}{3}$, $P(A) = \frac{3}{4} - \frac{1}{3} = \frac{9}{12} - \frac{4}{12} = \frac{5}{12}$

5. a. $P(\text{red}) = \frac{4}{12} = \frac{1}{3}$ b. $P(\text{white}) = \frac{6}{12} = \frac{1}{2}$

c. $P(\text{red or white}) = \frac{4}{12} + \frac{6}{12} = \frac{10}{12} = \frac{5}{6}$

6. a. $P(\text{blue}) = \frac{2}{12} = \frac{1}{6}$ b. $P(\text{red}) = \frac{4}{12} = \frac{1}{3}$

c. $P(\text{blue or red}) = \frac{2}{12} + \frac{4}{12} = \frac{6}{12} = \frac{1}{2}$

7. a. $P(\text{blue}) = \frac{2}{12} = \frac{1}{6}$ b. $P(\text{not blue}) = 1 - \frac{1}{6} = \frac{5}{6}$

8. a. $P(\text{white}) = \frac{6}{12} = \frac{1}{2}$ b. $P(\text{not white}) = 1 - \frac{1}{2} = \frac{1}{2}$

9. a. $P(\text{odd-numbered}) = \frac{6}{12} = \frac{1}{2}$ b. $P(\text{red}) = \frac{4}{12} = \frac{1}{3}$

c. $P(\text{odd-numbered or red}) = \frac{6}{12} + \frac{4}{12} = \frac{10}{12} = \frac{5}{6}$

10. a. $P(\text{odd-numbered}) = \frac{6}{12} = \frac{1}{2}$ b. $P(\text{blue}) = \frac{2}{12} = \frac{1}{6}$

c. $P(\text{odd-numbered or blue}) = \frac{6}{12} + \frac{2}{12} = \frac{8}{12} = \frac{2}{3}$

11. a. $P(5) = \frac{4}{20} = \frac{1}{5}$ b. $P(\text{less than } 3) = \frac{8}{20} = \frac{2}{5}$

c. $P(5 \text{ or less than } 3) = \frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

12. a. $P(2) = \frac{4}{20} = \frac{1}{5}$ b. $P(\text{greater than } 3) = \frac{8}{20} = \frac{2}{5}$

c. $P(2 \text{ or greater than } 3) = \frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

13. a. $P(\text{D}) = \frac{5}{20} = \frac{1}{4}$ b. $P(\text{red card greater than } 2) = \frac{6}{20} = \frac{3}{10}$

c. $P(\text{D or red card greater than } 2) = \frac{5}{20} + \frac{6}{20} = \frac{11}{20}$

14. a. $P(\text{B}) = \frac{5}{20} = \frac{1}{4}$ b. $P(\text{blue card greater than } 3) = \frac{4}{20} = \frac{1}{5}$

c. $P(\text{B or blue card greater than } 3) = \frac{5}{20} + \frac{4}{20} = \frac{9}{20}$

15. a. $P(\text{sum} = 9) = \frac{4}{36} = \frac{1}{9}$ b. $P(\text{a double}) = \frac{6}{36} = \frac{1}{6}$

c. $P(\text{sum} = 9 \text{ or a double}) = \frac{4}{36} + \frac{6}{36} = \frac{10}{36} = \frac{5}{18}$

16. a. $P(\text{sum} = 7) = \frac{6}{36} = \frac{1}{6}$ b. $P(\text{a double}) = \frac{6}{36} = \frac{1}{6}$

c. $P(\text{sum} = 7 \text{ or a double}) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$

17. $P(\text{hit}) = 0.35$; odds against $= \frac{1 - 0.35}{0.35} = \frac{0.65}{0.35} = \frac{13}{7}$; 13 to 7

18. $P(\text{win}) = 0.55$; odds of losing $= \frac{1 - 0.55}{0.55} = \frac{0.45}{0.55} = \frac{9}{11}$; 9 to 11

Try it answers for Tuesday, April 7, 2020

4. There are 52 cards in a standard deck of playing cards. Draw a single card.

   Event A: Draw the King of Spades
   Event B: Draw an Ace.

   P(A) = 1/52 P(B) = 4/52

   The probability of getting the King of Spades or an Ace, $P(A \text{ or } B)$ is 5/52

5. In each example from Activity 2, events A and B were mutually Exclusive

6. State the relationship between $P(A)$, $P(B)$, and $P(A \text{ or } B)$.

   $P(A \text{ or } B) = P(A) + P(B)$.

7. Your class is electing a new president. The probability of John becoming the class president is 0.2 and the probability of Jenny becoming the class president is 0.4. What is the probability of either John **or** Jenny becoming the class president?

   $.2 + .4 = 0.6$

Answers for Exercises for Tuesday, April 7, 2020

Pg 417 Class Exercises #1, 4 ,5, 6

Page 417 • CLASS EXERCISES

1. $P(A \text{ or } B) = 0.4 + 0.5 - 0.2 = 0.7$
2. $P(A \text{ or } B) = \frac{1}{2} + \frac{1}{2} - \frac{1}{3} = \frac{3}{6} + \frac{3}{6} - \frac{2}{6} = \frac{2}{3}$
3. $P(A \text{ or } B) = \frac{1}{2} + \frac{3}{4} - \frac{3}{8} = \frac{4}{8} + \frac{6}{8} - \frac{3}{8} = \frac{7}{8}$
4. $P(A \text{ or } B) = 0.75 + 0.50 - 0.30 = 0.95 = 95\%$
5. $P(A \text{ and } B) = 0$; $P(A \text{ or } B) = P(A) + P(B)$
6. yes; $P(A \text{ and } B)$ has been added to both sides of the equation $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$.

Try it Exercises for Wednesday, April 8, 2020

Compute: 1) p (girl) 13/30 p(boy) 17/30 P(Derrick) 1/30 P(Derrick') 29/30 2.) p(Monday) 1/7 p(Weekday) 5/7 P(Weekend) 2/7

Justify: 1: The sections are not split into equal pieces, so there is not a ¼ chance of spinning 4. The section is bigger than ¼ of the circle.

Pre-Algebra: Chapter 11 Probability
April 6 – April 10

Answers for Exercises for Wednesday, April 8, 2020

"Written Exercises" pp. 418, 1-13 odd.

Pages 418–419 · WRITTEN EXERCISES

A 1. $P(A \text{ or } B) = 0.35 + 0.55 - 0.20 = 0.7$

2. $P(A \text{ or } B) = \frac{3}{8} + \frac{3}{4} - \frac{1}{4} = \frac{3}{8} + \frac{6}{8} - \frac{2}{8} = \frac{7}{8}$

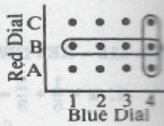
3. $P(A \text{ or } B) = \frac{1}{3} + \frac{1}{2} - \frac{1}{4} = \frac{4}{12} + \frac{6}{12} - \frac{3}{12} = \frac{7}{12}$

4. $P(A \text{ or } B) = 0.45 + 0.75 - 0.30 = 0.9$

5. $0.85 = 0.65 + P(B) - 0.30$, $0.85 = 0.35 + P(B)$, $P(B) = 0.5$

6. $0.80 = 0.75 + P(B) - 0.15$, $0.80 = 0.60 + P(B)$, $P(B) = 0.2$

7. a. $P(4) = \frac{3}{12} = \frac{1}{4}$

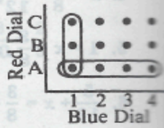


b. $P(B) = \frac{4}{12} = \frac{1}{3}$

c. $P(4 \text{ and } B) = \frac{1}{12}$

d. $P(4 \text{ or } B) = P(4) + P(B) - P(4 \text{ and } B) = \frac{1}{4} + \frac{1}{3} - \frac{1}{12} = \frac{1}{2}$

8. a. $P(1) = \frac{3}{12} = \frac{1}{4}$

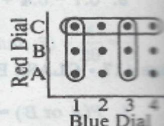


b. $P(A) = \frac{4}{12} = \frac{1}{3}$

c. $P(1 \text{ and } A) = \frac{1}{12}$

d. $P(1 \text{ or } A) = P(1) + P(A) - P(1 \text{ and } A) = \frac{1}{4} + \frac{1}{3} - \frac{1}{12} = \frac{1}{2}$

9. a. $P(\text{odd}) = \frac{6}{12} = \frac{1}{2}$

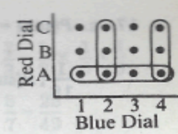


b. $P(C) = \frac{4}{12} = \frac{1}{3}$

c. $P(\text{odd and C}) = \frac{2}{12} = \frac{1}{6}$

d. $P(\text{odd or C}) = P(\text{odd}) + P(C) - P(\text{odd and C}) = \frac{1}{2} + \frac{1}{3} - \frac{1}{6} = \frac{2}{3}$

10. a. $P(\text{even}) = \frac{6}{12} = \frac{1}{2}$



b. $P(A) = \frac{4}{12} = \frac{1}{3}$

c. $P(\text{even and A}) = \frac{2}{12} = \frac{1}{6}$

d. $P(\text{even or A}) = P(\text{even}) + P(A) - P(\text{even and A}) = \frac{1}{2} + \frac{1}{3} - \frac{1}{6} = \frac{2}{3}$

B 11. $P(C) = \frac{5}{20} = \frac{1}{4}$; $P(\text{number greater than 3}) = \frac{8}{20} = \frac{2}{5}$; $P(\text{C and number greater than 3}) = \frac{2}{20} = \frac{1}{10}$; $P(\text{C or number greater than 3}) = \frac{1}{4} + \frac{2}{5} - \frac{1}{10} = \frac{11}{20}$

12. $P(D) = \frac{5}{20} = \frac{1}{4}$; $P(\text{number greater than 2}) = \frac{12}{20} = \frac{3}{5}$; $P(\text{D and number greater than 2}) = \frac{3}{20}$; $P(\text{D or number greater than 2}) = \frac{1}{4} + \frac{3}{5} - \frac{3}{20} = \frac{7}{10}$

13. $P(\text{blue}) = \frac{10}{20} = \frac{1}{2}$; $P(\text{number greater than 3}) = \frac{8}{20} = \frac{2}{5}$; $P(\text{blue and number greater than 3}) = \frac{4}{20} = \frac{1}{5}$; $P(\text{blue or number greater than 3}) = \frac{1}{2} + \frac{2}{5} - \frac{1}{5} = \frac{7}{10}$

14. $P(\text{red}) = \frac{10}{20} = \frac{1}{2}$; $P(\text{number greater than 2}) = \frac{12}{20} = \frac{3}{5}$; $P(\text{red and number greater than 2}) = \frac{6}{20} = \frac{3}{10}$; $P(\text{red or number greater than 2}) = \frac{1}{2} + \frac{3}{5} - \frac{3}{10} = \frac{4}{5}$

Thursday, April 9, 2020
Class Exercises: page 421 # 1 – 6 odds

Page 421 • CLASS EXERCISES

1. yes; $P(A \text{ and } B) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
2. yes; $P(A \text{ and } B) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$
3. no; the events are not independent, because the choice of the second marble would be affected by the choice of the first marble.
4. yes; $P(A \text{ and } B) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$
5. yes; $P(A \text{ and } B) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$
6. no; the events are not independent, because 3 and 5 are both prime and odd.

Exercise for Thursday, April 9, 2020
"Written Exercises" pp. 422-423, 1-13 odd.

Pages 422–423 • WRITTEN EXERCISES

A

1. $P(A) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$; $P(B) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$; $P(C) = P(\text{H, T}) + P(\text{T, H}) = \frac{1}{2} \times \frac{1}{2} + \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$
2. $P(A) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$; $P(B) = \frac{5}{6} \times \frac{5}{6} = \frac{25}{36}$; $P(C) = P(6, \text{not } 6) + P(\text{not } 6, 6) = \frac{1}{6} \times \frac{5}{6} + \frac{5}{6} \times \frac{1}{6} = \frac{5}{36} + \frac{5}{36} = \frac{5}{18}$
3. $P(A) = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$; $P(B) = \frac{3}{4} \times \frac{3}{4} = \frac{9}{16}$; $P(C) = P(A) + P(B) = \frac{1}{16} + \frac{9}{16} = \frac{5}{8}$; $P(D) = P(\text{red, blue}) + P(\text{blue, red}) = \frac{1}{4} \times \frac{3}{4} + \frac{3}{4} \times \frac{1}{4} = \frac{3}{16} + \frac{3}{16} = \frac{3}{8}$
4. $P(A) = \frac{2}{3} \times \frac{2}{3} = \frac{4}{9}$; $P(B) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$; $P(C) = P(A) + P(B) = \frac{4}{9} + \frac{1}{9} = \frac{5}{9}$; $P(D) = P(\text{red, blue}) + P(\text{ blue, red}) = \frac{2}{3} \times \frac{1}{3} + \frac{1}{3} \times \frac{2}{3} = \frac{2}{9} + \frac{2}{9} = \frac{4}{9}$
5. $P(A) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$; $P(B) = \frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$; $P(C) = P(\text{odd, even}) + P(\text{even, odd}) = \frac{2}{3} \times \frac{1}{3} + \frac{1}{3} \times \frac{2}{3} = \frac{2}{9} + \frac{2}{9} = \frac{4}{9}$

6. $P(A) = \frac{1}{10} \times \frac{1}{10} = \frac{1}{100}$; $P(B) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$; $P(C) = P(\text{odd, even}) + P(\text{even, odd}) = \frac{1}{2} \times \frac{1}{2} + \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$

7. $P(A) = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$; $P(B) = \frac{3}{4} \times \frac{3}{4} = \frac{9}{16}$; $P(C) = P(\text{C, not C}) + P(\text{not C, C}) + P(\text{C, C}) = \frac{1}{4} \times \frac{3}{4} + \frac{3}{4} \times \frac{1}{4} + \frac{1}{4} \times \frac{1}{4} = \frac{3}{16} + \frac{3}{16} + \frac{1}{16} = \frac{7}{16}$; $P(D) = P(\text{C, not C}) + P(\text{not C, C}) = \frac{1}{4} \times \frac{3}{4} + \frac{3}{4} \times \frac{1}{4} = \frac{3}{16} + \frac{3}{16} = \frac{3}{8}$

8. $P(A) = \frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$; $P(B) = \frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$; $P(C) = P(\text{greater than 3, not greater than 3}) + P(\text{not greater than 3, greater than 3}) + P(\text{greater than 3, greater than 3}) = \frac{2}{5} \times \frac{3}{5} + \frac{3}{5} \times \frac{2}{5} + \frac{2}{5} \times \frac{2}{5} = \frac{6}{25} + \frac{6}{25} + \frac{4}{25} = \frac{16}{25}$; $P(D) = P(\text{greater than 3, not greater than 3}) + P(\text{not greater than 3, greater than 3}) = \frac{2}{5} \times \frac{3}{5} + \frac{3}{5} \times \frac{2}{5} = \frac{6}{25} + \frac{6}{25} = \frac{12}{25}$

B 9. $P(A) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16}$; $P(B) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16}$

10. $P(A) = \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} = \frac{1}{216}$; $P(B) = \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{125}{216}$

11. $P(A) = (0.6)(0.6)(0.6) = 0.216$; $P(B) = (0.4)(0.4)(0.4) = 0.064$

12. $P(A) = (0.2)(0.2)(0.2)(0.2) = 0.0016$; $P(B) = (0.8)(0.8)(0.8)(0.8) = 0.4096$

13. $P(A) = \frac{1}{2}$

14. $P(A) = \frac{1}{6}$

C 15. $P(A) = \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{1}{64}$; $P(B) = \frac{1}{4} \times \frac{3}{4} \times \frac{3}{4} = \frac{9}{64}$; $P(C) = P(\text{C, not C, not C}) + P(\text{not C, C, not C}) + P(\text{not C, not C, C}) = \frac{1}{4} \times \frac{3}{4} \times \frac{3}{4} + \frac{3}{4} \times \frac{1}{4} \times \frac{3}{4} + \frac{3}{4} \times \frac{3}{4} \times \frac{1}{4} = \frac{9}{64} + \frac{9}{64} + \frac{9}{64} = \frac{27}{64}$

16. $P(A) = \frac{3}{4} \times \frac{3}{4} \times \frac{3}{4} = \frac{27}{64}$; $P(B) = \frac{1}{4} \times \frac{1}{4} \times \frac{3}{4} = \frac{3}{64}$; $P(C) = P(\text{C, C, not C}) + P(\text{C, not C, C}) + P(\text{not C, C, C}) = \frac{1}{4} \times \frac{1}{4} \times \frac{3}{4} + \frac{1}{4} \times \frac{3}{4} \times \frac{1}{4} + \frac{3}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{3}{64} + \frac{3}{64} + \frac{3}{64} = \frac{9}{64}$

NOTE: **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 problems as I instruct with the proper titles and labels.**

GreatHearts®

Pre-Algebra **Probability Quiz** **Name** ________________________

1. Fill in the blanks with either "outcomes favoring E" or "possible outcomes."

   The probability of event E is P(E) = $\dfrac{\#\,of\ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_}{\#\,of\ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_}$

2. Could the two events (A and B) in the following situations happen at the same time? Write yes or no in the box to the right of each example.
   a. Roll a single standard die. ☐
      Event A: Roll the die and get a "1".
      Event B: Roll the die and get a "4".

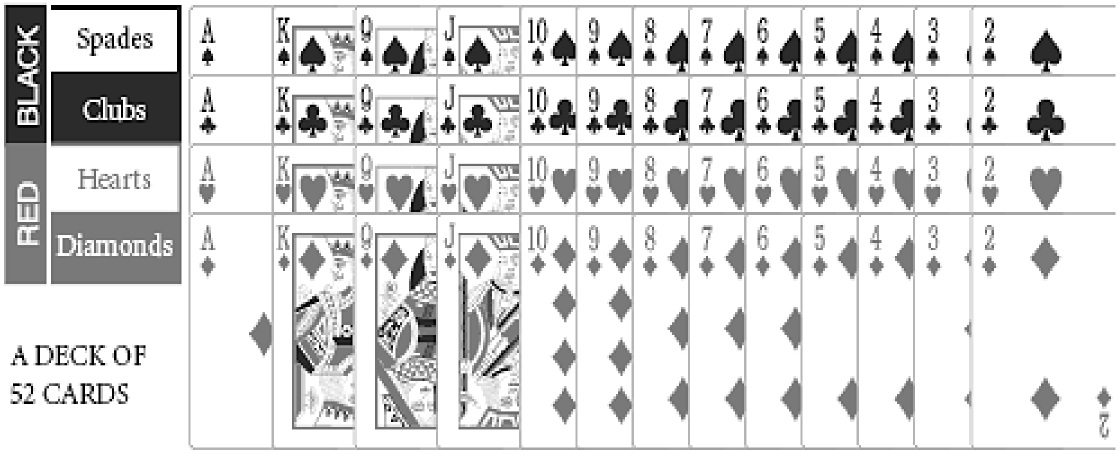
   b. A single card is drawn from a deck of standard playing cards. ☐
      Event A: A diamond is drawn.
      Event B: A Queen is drawn.

3. Fill in the formula for each.

If A and B are mutually exclusive events, then P(A or B) is:
If A and B are overlapping events, then P(A or B) is:

(Quiz continued on next page!!)

4. If you draw one card from a standard deck of cards:



   a. What is the probability of drawing a 5 or a diamond?

   b. Are they mutually exclusive events? Why or why not?

5. You have a bag with 4 blue, 3 orange and 2 red marbles. You draw one marble and then you put it back into the bag and select a second marble. What is the probability of getting two orange marbles?