Cover Sheet for Collection of Assignments and Student Work

1. Title of Assignment: *Sample Space and Tree Diagrams*
2. Date Assigned to Students: March 20th, 2018

3. You were asked to select a challenging assignment. Please explain why this assignment is challenging for students.

   This assignment was the students' first look at compound probability, and I did not give them any shortcuts. Students had to be detailed and organized in their work, looking at much larger quantities of data than they had up until this point. It was challenging because these problems are a lot of work to complete, and require a solid understanding of the patterns that occur in a tree diagram. This assignment allowed students to develop that understanding, through practice and trial and error. I also asked students to challenge themselves in looking for patterns in their tree diagrams, since a thorough understanding of how tree diagrams work would lead them to discover the Fundamental Counting Principle.

4. Upload the assignment and any instructions that were given to students in the respective Google Drive Folder. If this is not possible, use the space below to state the task and describe the instructions.

   A blank example of the assignment, as well as the key, are in the Google Drive Folder. Students took notes about compound probability and sample space, and then the class worked through one example of a tree diagram together. From there the students were released to try out creating tree diagrams for themselves. Many students had trouble getting started, so after about 5-10 minutes I went back and worked through how to start the first tree diagram on the whiteboard. Students were told that they were expected to finish this practice during the next 45 minutes of class, and that the assignment would be turned in at the end of class. The assignment should have been complete when turned in. In the typical style of our in-class practice work, this assignment would not be for a grade, but as a result that meant the students would be all the more responsible for asking questions if they encountered a problem they did not understand. The teacher would monitor students' progress and catch/help correct mistakes.

5. Where was this assignment drawn from?

I created this worksheet.

6. Did you adapt this assignment? If so, describe adaptations & rationale for making them.

No adaptations were made - I created this assignment to meet my students' necessary learning criteria and capability.

7. Describe the unit this assignment was a part of, including the goals of the unit:

This assignment was part of a 7th grade probability unit. The goal of this unit was for students to be able to calculate the probability of a variety of different types of events, given a sample space of the possible outcomes. The unit started with simple events, building up to compound events including permutations and dependent events.

8. What role did this assignment play in the unit (e.g., summative assessment, knowledge acquisition, practice, active participation, making a connection to the real world or other contexts):

This assignment was the first to bridge the jump up to compound events, by helping students to picture the whole sample space for a given probability question. It was given as an investigation of new ideas, and for practice.

9. What kinds of activities did your students engage in while working on this assignment?

Collaboration with peers, referencing notes as a resource, answering higher-level questions from teachers, completing worksheet, analyzing data for patterns, making connections.

10. What expectations were given to students for quality work?

Students should work toward having a completed worksheet, with work neatly organized. They should be asking questions of their peers and the teacher in order to solidify understanding. They should also try to look for any patterns or connections between the events and the sample space.

11. Describe your grading criteria in the format provided below. If you created a rubric or grading criteria, *upload these to the Google Drive Folder* and indicate this below. If

your students used a criteria chart or rubric that was posted in the classroom [that you were unable to upload], please sketch or describe it here.)

High: Worksheet is neat, organized, and complete. Student may have taken liberties in their organization of ideas (i.e. organized the sample space using a different method than tree diagrams), but they still reached the appropriate sample space for their answer. Student also answered probability questions correctly.
Medium: Work is relatively well organized, and shows that student's understanding of sample space and tree diagrams improved with practice. May have some errors, but understanding of key ideas is evident on at least one tree diagram, and some probability questions.
Low: Student's work does not indicate an understanding of tree diagrams, and they did not list the sample space. Work is unorganized, or incorrect.

12. How did you share your grading criteria for this assignment with students before this assignment was due? (e.g.: develop criteria with students, discuss expectations /scoring guides with students in class)

Students were given the directions verbally when starting the assignment, including the expectation that their work be completed during the class period, that their work should be neat and organized, and that they should ask questions as much as needed in order to develop their understanding and to complete the assignment. The expectation that a completed assignment have correct answers is obviously implied when doing practice problems.

Task

Name _____

Sample Space and Tree Diagrams

Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

P(blue eyes, red hair) =

P(brown eyes, dark{brown or black} hair) =

2) Four different shirts, two different pairs of pants

P(wearing shirt #1) =

P(shirt #1 with pants #1) =

Task

Name _____

3) Roll 1 die, flip 2 coins

P(1, H, H) =

P(even number, one H and one T) =

4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) =

P(any cheese, no meat, any drink) =

Name Key

Sample Space and Tree Diagrams

Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

Key - list, table, or tree diagram is fine (can abbreviate as needed) as long as you end up with the correct sample space.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

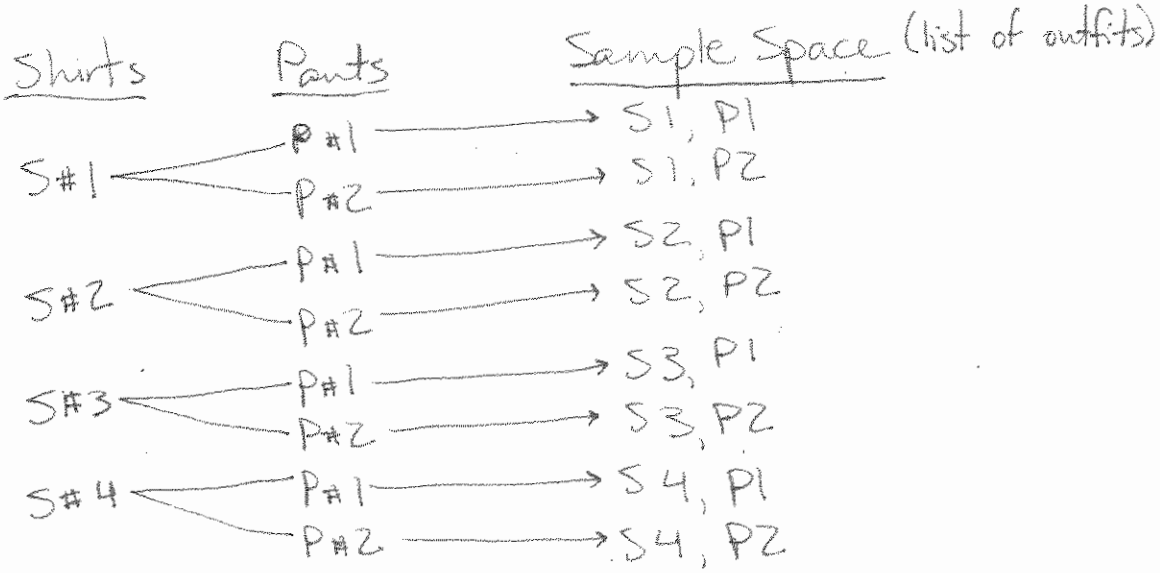
P(blue eyes, red hair) = 1/12

P(brown eyes, dark{brown or black} hair) = 2/12 = 1/6

2) Four different shirts, two different pairs of pants

P(wearing shirt #1) = 1/4

P(shirt #1 with pants #1) = 1/8

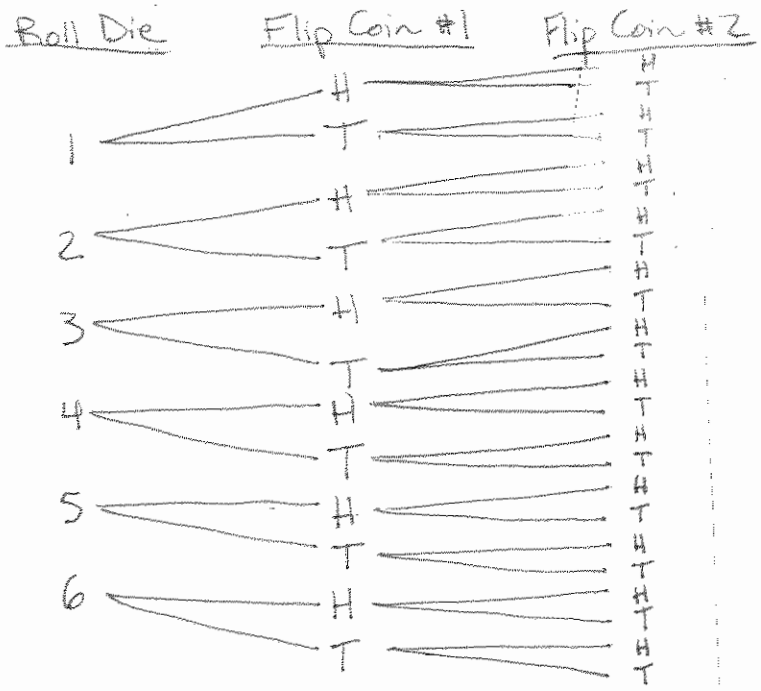


Name Key

3) Roll 1 die, flip 2 coins

P(1, H, H) = 1/24

P(even number, one H and one T) = 6/24 = 1/4



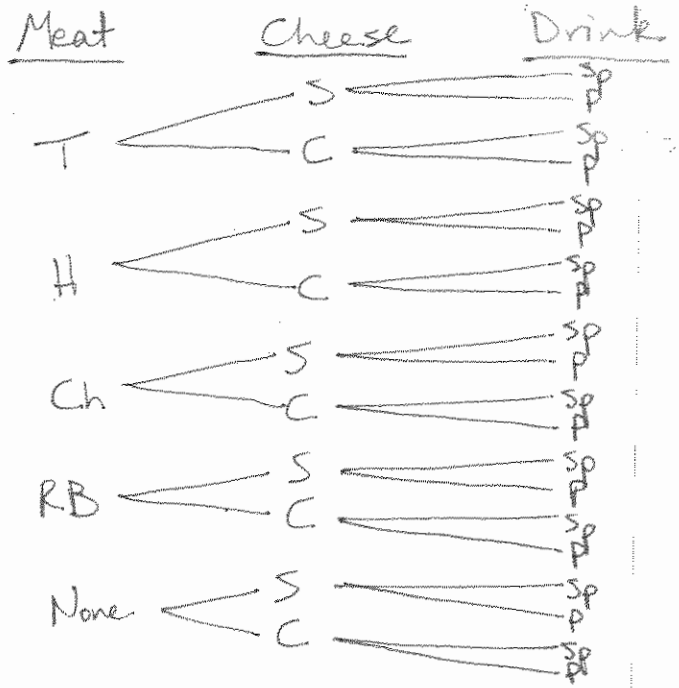
Sample Space

1 HH	4 HH
1 HT	4 HT
1 TH	4 TH
1 TT	4 TT
2 HH	5 HH
2 HT	5 HT
2 TH	5 TH
2 TT	5 TT
3 HH	6 HH
3 HT	6 HT
3 TH	6 TH
3 TT	6 TT

4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = 1/20

P(any cheese, no meat, any drink) = 4/20 = 1/5



Sample Space

T, S, Sp	Ch, S, Sp
T, S, P	Ch, S, P
T, C, Sp	Ch, C, Sp
T, C, P	Ch, C, P
H, S, Sp	RB, S, Sp
H, C, Sp	RB, C, Sp
H, S, P	RB, S, P
H, C, P	RB, C, P
	None, S, Sp
	None, C, Sp
	None, S, P
	None, C, P

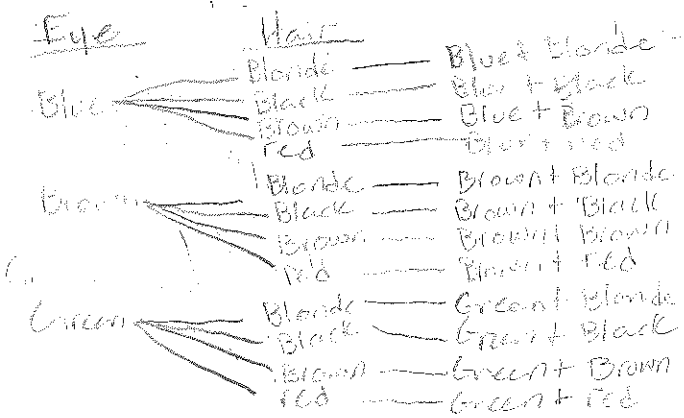
Sample Space and Tree Diagrams

Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

P(blue eyes, red hair) = 1/12

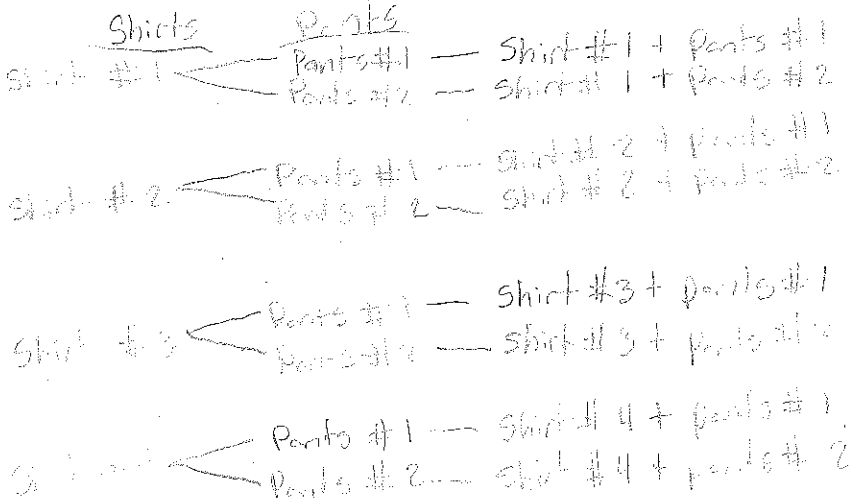
P(brown eyes, dark{brown or black} hair) = 3/12 - 1/6



2) Four different shirts, two different pairs of pants

P(wearing shirt #1) = 2/8 = 1/4

P(shirt #1 with pants #1) = 1/8



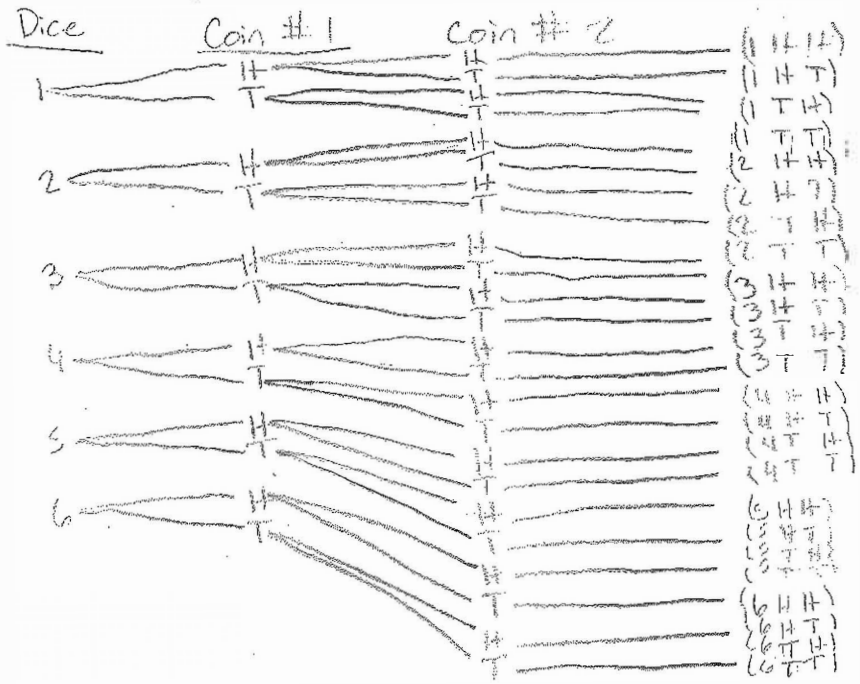
Student work: Excelled

Name _____

3) Roll 1 die, flip 2 coins

P(1, H, H) = 1/24

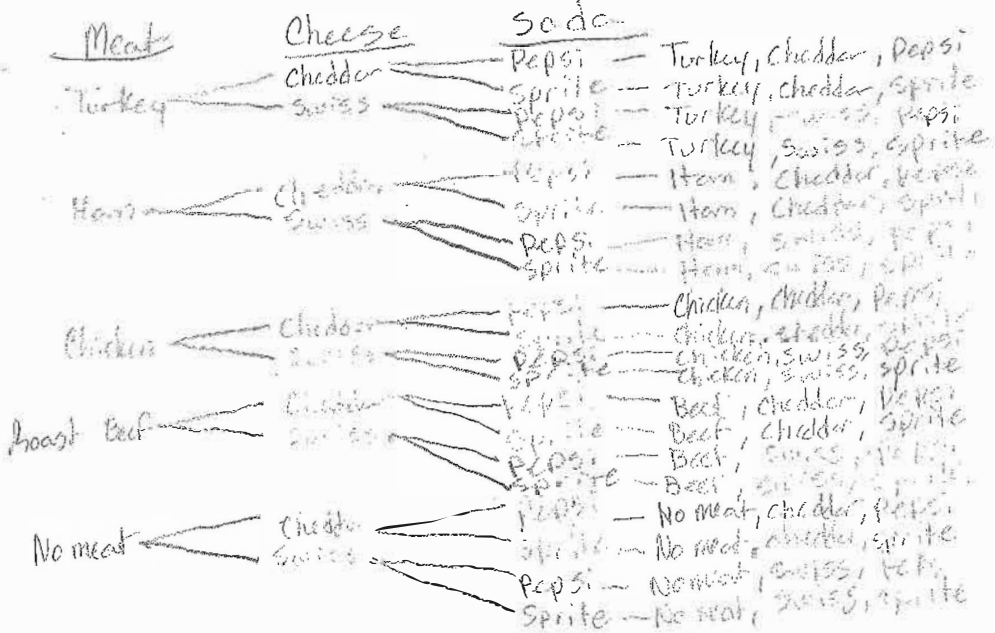
P(even number, one H and one T) = 6/24 = 3/12 = 1/4



4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = 1/20

P(any cheese, no meat, any drink) = 4/20 = 2/10 = 1/5



Student work: Excelled

Sample Space and Tree Diagrams

Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

Eyes				
BL	B	N	L	R
BR	B	N	L	R
GR	B	N	L	R

P(blue eyes, red hair) = 1/12

P(brown eyes, dark{brown or black} hair) = 1/6

BL/B	BR/B	GR/B
BL/N	BR/N	GR/N
BL/L	BR/L	GR/L
BL/R	BR/R	GR/R

2) Four different shirts, two different pairs of pants

1S	1P	2P
2S	1P	2P
3S	1P	2P
4S	1P	2P

P(wearing shirt #1) = 1/4 25%

P(shirt #1 with pants #1) = 1/8

1S/1P	2S/1P	3S/1P	4S/1P
1S/2P	2S/2P	3S/2P	4S/2P

Student work: Excelled

Name _____

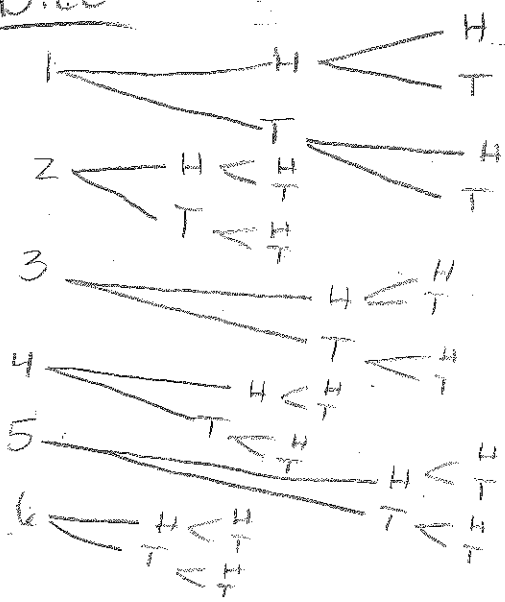
1	1T	1H	2T	2H
2	1T	1H	2T	2H
3	1T	1H	2T	2H
4	1T	1H	2T	2H
5	1T	1H	2T	2H
6	1T	1H	2T	2H

3) Roll 1 die, flip 2 coins

P(1, H, H) = 1/24

P(even number, one H and one T) = 1/2 50% 12/24

Dice



1HH
1HT
1TH
1TT
2HH
2HT
2TH
2TT
3HH
3HT
3TH
3TT
4HH
4HT
4TH
4TT
5HH
5HT
5TH
5TT
6HH
6HT
6TH
6TT

4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = 1/20 5%

P(any cheese, no meat, any drink) = 4/20 20%

PE	S	CH	TK	HM	C	RB	NA
SP	S	CH	TK	HM	C	RB	NA

PE-S-TK	SP-S-TK
PE-S-HM	SP-S-HM
PE-S-C	SP-S-C
PE-S-RB	SP-S-RB
PE-S-NA	SP-S-NA
PE-CH-TK	SP-CH-TK
PE-CH-HM	SP-CH-HM
PE-CH-C	SP-CH-C
PE-CH-RB	SP-CH-RB
PE-CH-NA	SP-CH-NA

Student work: Adequate

Sample Space and Tree Diagrams

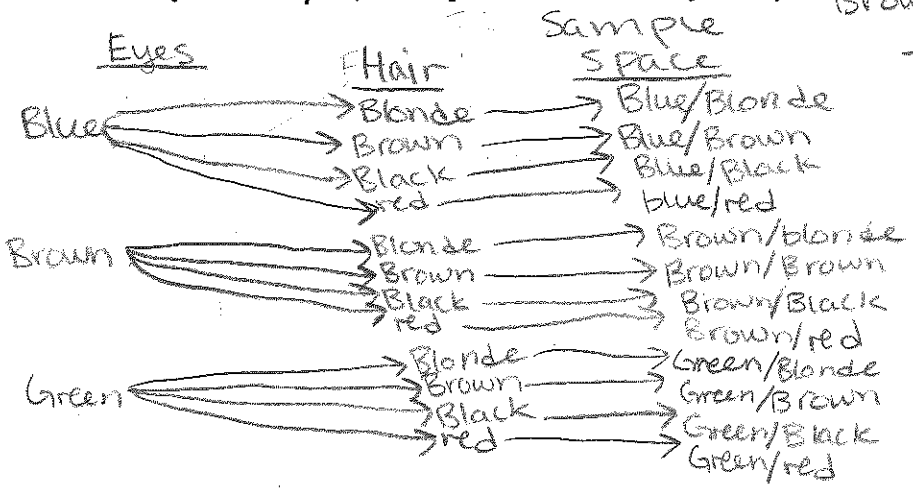
Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

P(blue eyes, red hair) = Blue/red

P(brown eyes, dark{brown or black} hair) = Brown/Brown Brown/Black

3.4 = 12

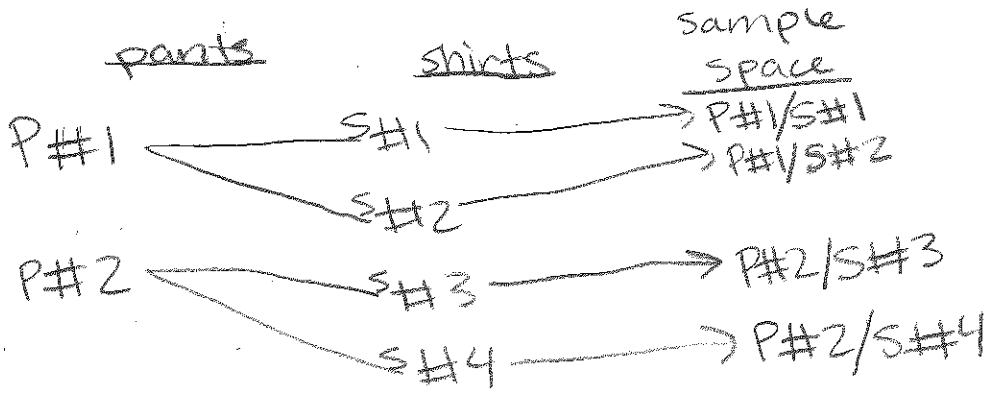


2) Four different shirts, two different pairs of pants

P(wearing shirt #1) = with P#1

P(shirt #1 with pants #1) = P#1/S#1

4.2 = 8



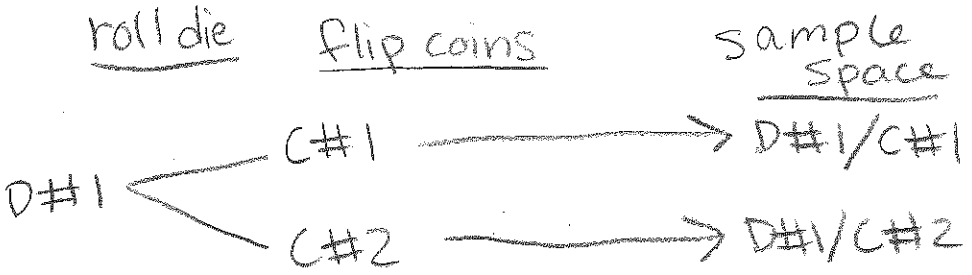
Student work: Adequate

3) Roll 1 die, flip 2 coins

P(1, H, H) =

P(even number, one H and one T) =

$6 \cdot 2 \cdot 2 = 24$

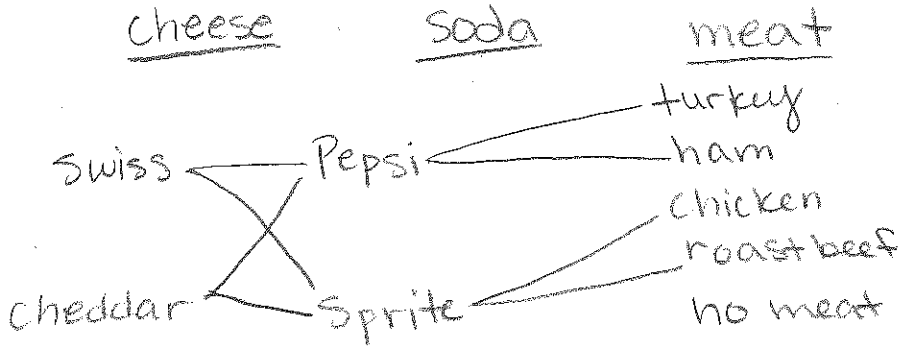


$2 \cdot 5 \cdot 2 = 20$

4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = Swiss/Turkey/Sprite

P(any cheese, no meat, any drink) = cheddar/no meat/Sprite



swiss, turkey, pepsi
swiss, ham, pepsi
swiss, chicken, pepsi
swiss, roast beef, pepsi
swiss, no meat, pepsi
swiss, turkey, sprite
swiss, ham, sprite
swiss, chicken, sprite
swiss, roast beef, sprite
swiss, no meat, sprite
cheddar, turkey, pepsi
cheddar, ham, pepsi
cheddar, chicken, pepsi
cheddar, roast beef, pepsi
cheddar, no meat, pepsi
cheddar, turkey, sprite
cheddar, ham, sprite
cheddar, chicken, sprite
cheddar, roast beef, sprite
cheddar, no meat, sprite

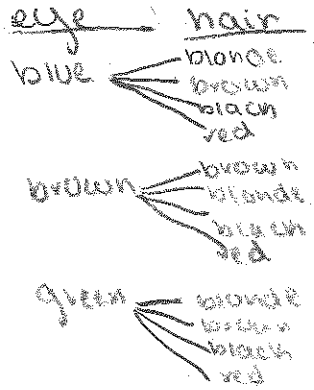
Sample Space and Tree Diagrams

Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

P(blue eyes, red hair) = 1/12

P(brown eyes, dark{brown or black} hair) =

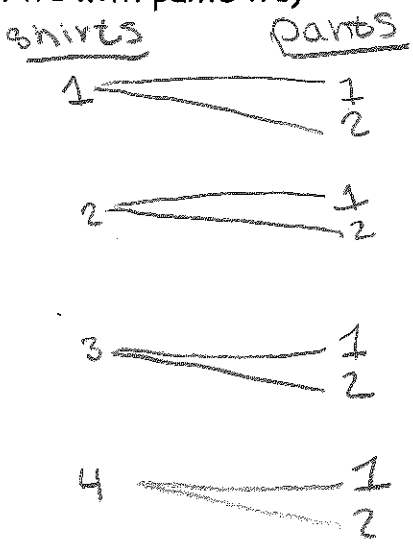


Sample
bl / blo
bl / br
bl / bla
bl / r
br / br
br / bl
br / bla
br / r
g / bl
g / br
g / bla
g / r

2) Four different shirts, two different pairs of pants

P(wearing shirt #1) = 3/8

P(shirt #1 with pants #1) = 1/8



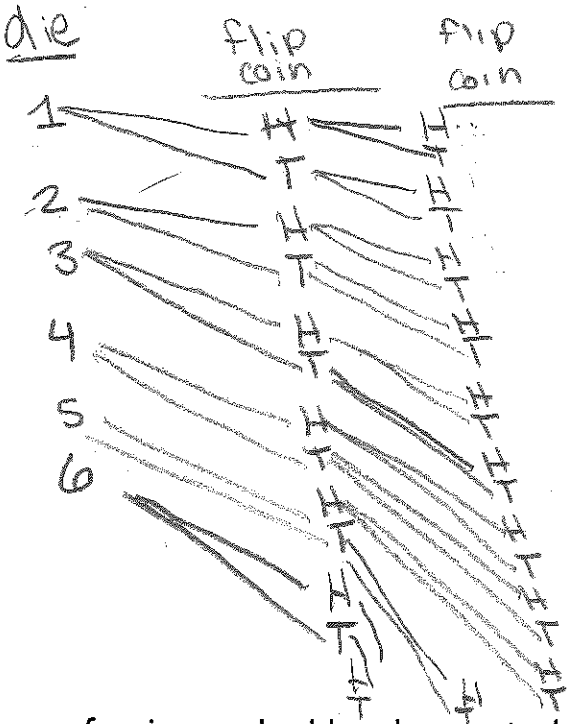
S.S
1, 1
1, 2
2, 1
2, 2
3, 1
3, 2
4, 1
4, 2

Name Student work: Adequate

3) Roll 1 die, flip 2 coins

P(1, H, H) = $7/24$

P(even number, one H and one T) = $6/24$



S, S

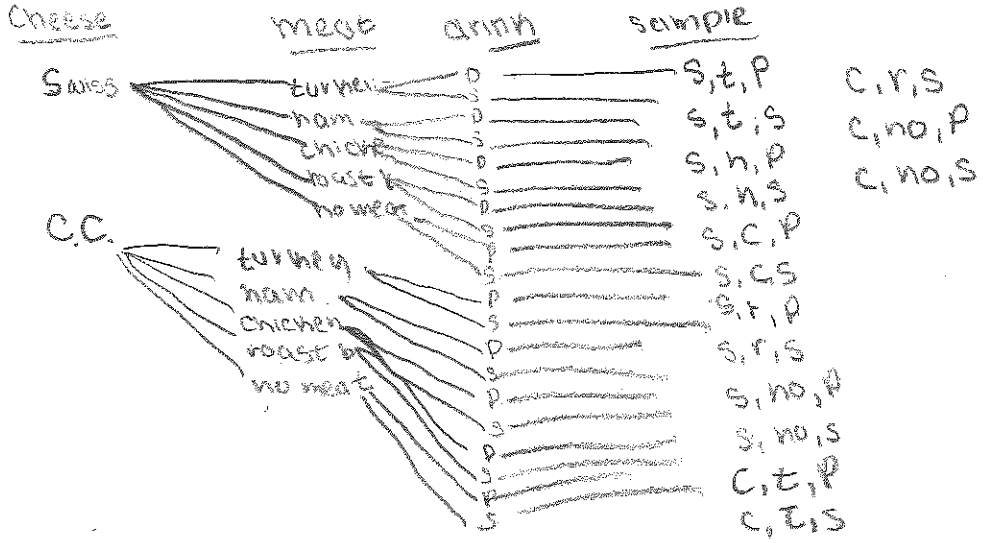
1, H, H
1, H, T
1, T, H
1, T, T
2, H, H
2, H, T
2, T, H
2, T, T
3, H, H
3, H, T
3, T, H
3, T, T
4, H, H
4, H, T
4, T, H
4, T, T

5, H, H
5, H, T
5, T, H
5, T, T
6, H, H
6, H, T
6, T, H
6, T, T

4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = $1/20$

P(any cheese, no meat, any drink) = $4/20$



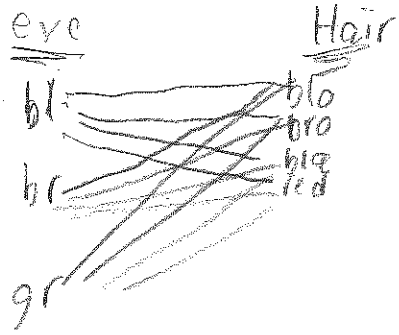
Sample Space and Tree Diagrams

Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

P(blue eyes, red hair) = $\frac{1}{4}$

P(brown eyes, dark{brown or black} hair) = $\frac{1}{3}$

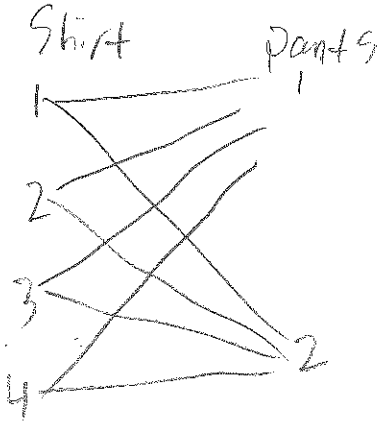


you can have 12 combinations

2) Four different shirts, two different pairs of pants

P(wearing shirt #1) = $\frac{1}{2}$

P(shirt #1 with pants #1) = $\frac{1}{4}$



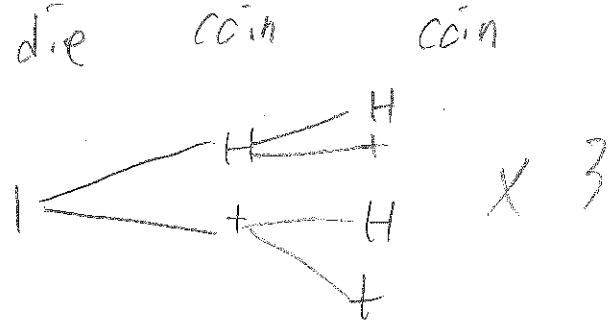
you can 8 combinations

Name _____

3) Roll 1 die, flip 2 coins

P(1, H, H) = $\frac{1}{4}$

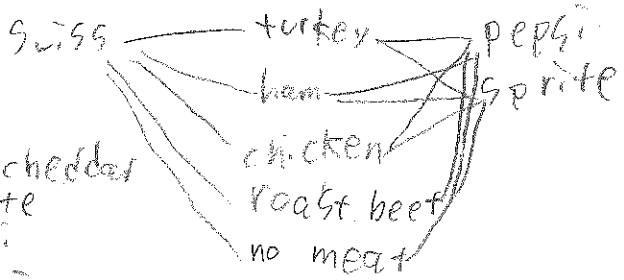
P(even number, one H and one T) = $\frac{1}{24}$



4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = $\frac{1}{20}$

P(any cheese, no meat, any drink) = $\frac{1}{5}$



swiss, turky, Sprite
swiss, turky, pepsi
swiss, ham, pepsi
swiss, ham, Sprite
swiss, chicken, pepsi
swiss, chicken, Sprite
swiss, roast, pepsi
swiss, roast, Sprite
swiss, no, pepsi
swiss, no, Sprite

X 2

Sample Space and Tree Diagrams

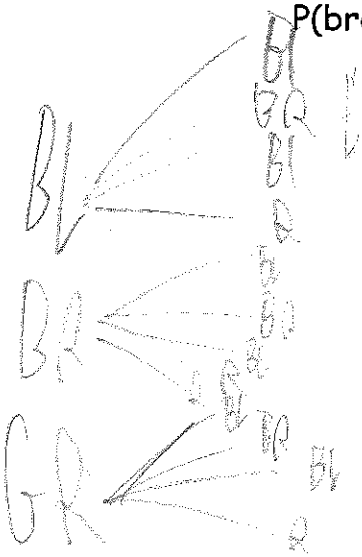
Directions: Find the sample space: How many combinations are there? Create a list, table, or tree diagram to help you find the sample space. Then calculate the probability for each given outcome.

1) Having blue, brown, or green eyes, and blonde, brown, black, or red hair

P(blue eyes, red hair) = 1/12

P(brown eyes, dark{brown or black} hair) = 1/4

12

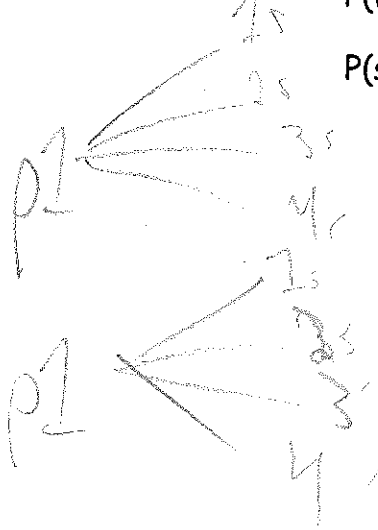


2) Four different shirts, two different pairs of pants

8

P(wearing shirt #1) = 1/4

P(shirt #1 with pants #1) = 1/8

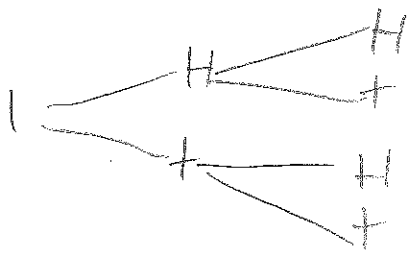


Name _____ Student work: Low Performing

3) Roll 1 die, flip 2 coins

P(1, H, H) = 1/24

P(even number, one H and one T) = 7/24



4) Chance of swiss or cheddar cheese, turkey, ham, chicken, roast beef, or no meat, and Pepsi or Sprite?

P(swiss, turkey, Sprite) = 1/36

P(any cheese, no meat, any drink) = 7/36