Unit 8 Quiz 1
Probability

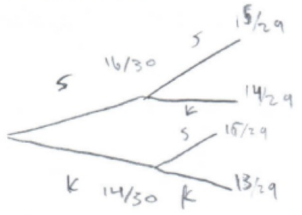
*Look over highlighted errors - this is where the mistake begins.

*Make quiz corrections... you will have an opportunity to improve this score!

"This mistake was cool!"

4. Two students each draw a piece of candy from a bag. In the bag, there are 16 Starbursts and 14 Hershey kisses. Students close their eyes and select one candy, and then eat it.

a) Create a tree diagram to model the scenario. *Label probabilities on the branches and at the end of each path.*



SS $\frac{240}{870}$

SK $\frac{224}{870}$

KS $\frac{224}{870}$

KK $\frac{182}{870}$

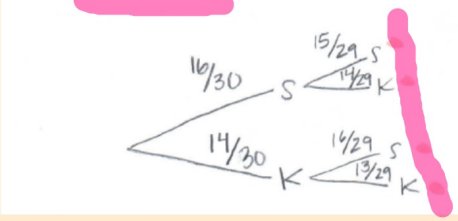
b) What is the probability that the first person **and** second person both choose a Hershey Kiss?

$\frac{14}{30} \cdot \frac{14}{29} = \frac{196}{870} = \frac{98}{435}$

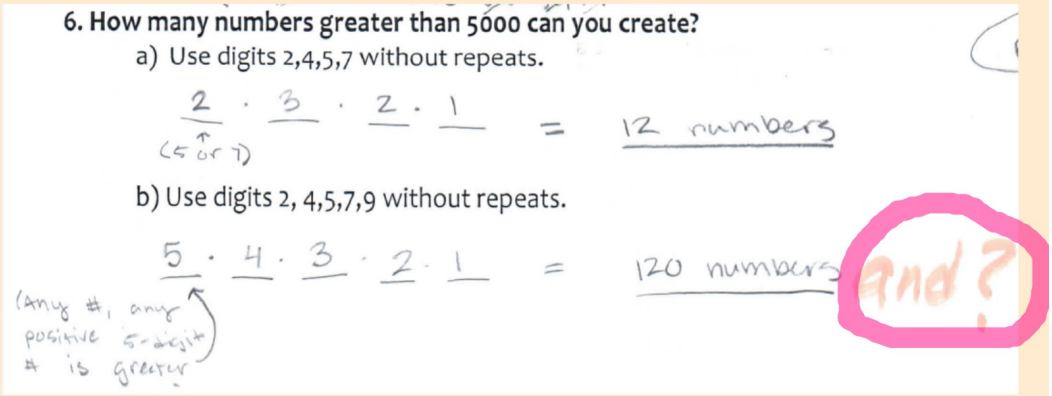
"This mistake surprised me!"

4. Two students each draw a piece of candy from a bag. In the bag, there are 16 Starbursts and 14 Hershey kisses. Students close their eyes and select one candy, and then eat it.

a) Create a tree diagram to model the scenario. *Label probabilities on the branches and at the end of each path.*



"I loved this mistake!"



6. How many numbers greater than 5000 can you create?

a) Use digits 2,4,5,7 without repeats.

2 · 3 · 2 · 1 = 12 numbers

(5 or 7)

b) Use digits 2, 4,5,7,9 without repeats.

5 · 4 · 3 · 2 · 1 = 120 numbers and?

(Any #, any positive 5-digit # is greater)

Version 1

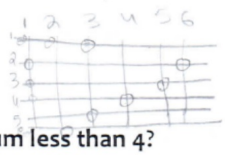
1. Jeffery is performing an experiment by rolling two dice. During his experiment he gets the following sums of rolls: 2, 5, 7, 7, 8, 9, 6, 4, 10, 11, 12, 12, 8, 4, 7, 10.

a) According to Jeffery's experiment, what is the probability of rolling a **sum of 8**?

$\frac{2}{16} = \frac{1}{8} = .125 = 12.5\%$

b) What is the theoretical probability of rolling a **sum of 8**?

$5/36 \approx 0.13\overline{8} \approx .13.8\%$



c) What is the theoretical probability of rolling **sum of 8 or a sum less than 4**?

$\frac{5}{36} + \frac{3}{36} = \frac{8}{36} \approx 0.2\overline{2} \approx 22\%$

Version 1

1. Jeffery is performing an experiment by rolling two dice. During his experiment he gets the following sums of rolls: 2, 5, 7, 7, 8, 9, 6, 4, 10, 11, 12, 12, 8, 4, 7, 10.

a) According to Jeffery's experiment, what is the probability of rolling a **sum of 8**?

16 total rolls
2 eights
$2/16 = 1/8 = .125 =$ 12.5% chance of an 8

b) What is the theoretical probability of rolling a **sum of 8**?

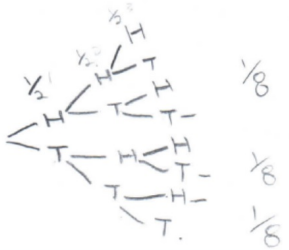
2+6, 3+5, 4+4
6+2 5+3
36 outcome
$5/36 \approx .139 \approx 13.9\%$ chance

c) What is the theoretical probability of rolling **sum of 8 or a sum less than 4**?

$8/36 = 2/9 \approx .22 \approx 22\%$ chance

Version 1

2. Three coins are tossed. Find the probability of tossing a head and 2 tails (regardless of order).



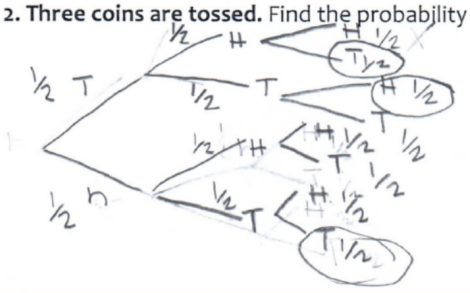
1/8

1/8

1/8

3/8 of tossing 1 head and 2 tails

2. Three coins are tossed. Find the probability of tossing a head and 2 tails (regardless of order).



1/2 * 1/2 * 1/2 = 1/8

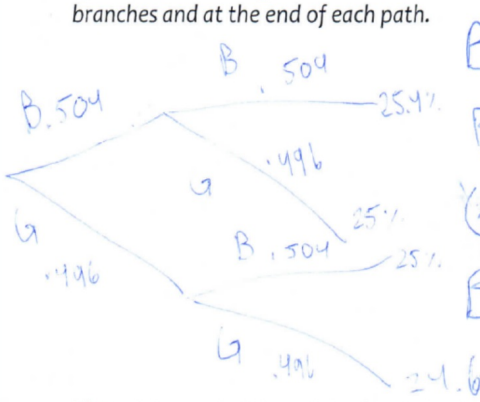
1/8 + 1/8 + 1/8 = 3/8

3/8 ≈ 37.5% chance

Version 1

3. A family will have two children. Based on the proportion of men and women in the world, the probability of a boy is 50.4% and the probability of a girl is 49.6%.

a) Create a tree diagram to model the scenario. *Label probabilities in decimal form on the branches and at the end of each path.*



BB ≈ 25.4%.
BG ≈ 50%.
GG ≈ 24.6%.
BG = GB

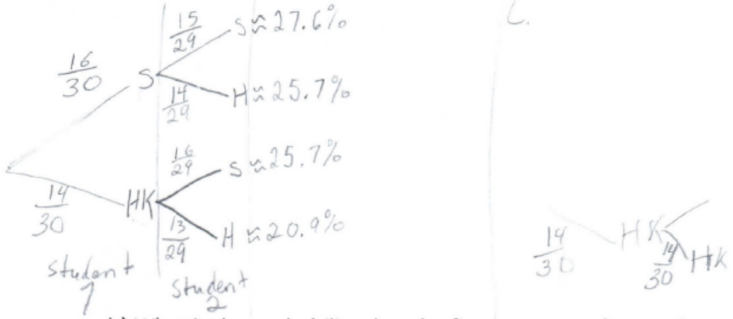
b) Find the probability of the family having at least one girl.

74.6% chance

Version 1

4. Two students each draw a piece of candy from a bag. In the bag, there are 16 Starbursts and 14 Hershey kisses. Students close their eyes and select one candy, and then eat it.

a) Create a tree diagram to model the scenario. *Label probabilities on the branches and at the end of each path.*



b) What is the probability that the first person **and** second person both choose a Hershey Kiss?

20.9%

c) Consider if the first student gets a piece of candy, and then puts it back in the bag as they decide they no longer want any candy. Now, what is the probability that the first person **and** second person both choose a Hershey Kiss?

$\frac{14}{30} \times \frac{14}{30} = 21.77\%$

Version 1

5. State if each scenario involves a permutation or a combination. Then find the number of possibilities.

a) There are 40 applicants for 3 computer programming positions.

Combination $\frac{40!}{3!(40-3)!} = 9880$

b) The student body of 60 students wants to elect a president, vice president, secretary, and treasurer.

Permutation $\frac{60!}{(60-4)!}$ $60 \cdot 59 \cdot 58 \cdot 57 \cdot 56 \cdot 55 \ldots$ 11703240

5. State if each scenario involves a permutation or a combination. Then find the number of possibilities.

a) There are 40 applicants for 3 computer programming positions.

Combination $\frac{40!}{(40-3)!\,3!} = \frac{40!}{37!3!} = 9880$

b) The student body of 60 students wants to elect a president, vice president, secretary, and treasurer.

Permutation $\frac{60!}{(60-4)!} = \frac{60!}{56!} = 11703240$

Version 1

6. How many numbers greater than 5000 can you create?

a) Use digits 2,4,5,7 without repeats.

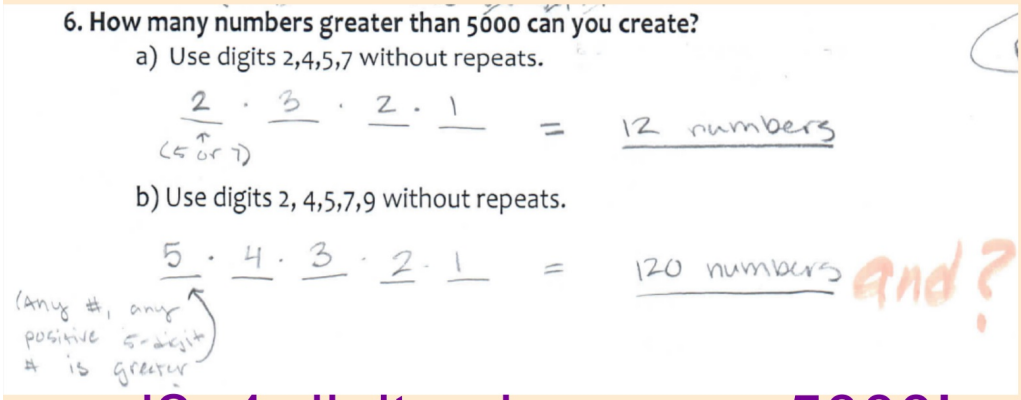
#'s in the 7000's (7 followed by arrangements of the remaining #
= 6 options, Plus #'s in the 5000's = 6 options for a total of

b) Use digits 2, 4,5,7,9 without repeats. of 12 options (3!)+(3!)=12

using 4 digits = 4! + 4! + 4! = 72 options

using all 5 digits = 5! = 120 120 + 72 = 192 options

Version 1



6. How many numbers greater than 5000 can you create?

a) Use digits 2,4,5,7 without repeats.

2 · 3 · 2 · 1 = 12 numbers

(5 or 7)

b) Use digits 2, 4,5,7,9 without repeats.

5 · 4 · 3 · 2 · 1 = 120 numbers and?

(Any #, any positive 5-digit # is greater)

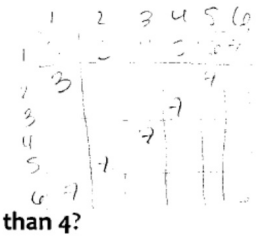
and? 4-digit values over 5000!

Version 2

1. Myles is performing an experiment by rolling two dice. During his experiment he gets the following sums of rolls: 2, 5, 7, 7, 8, 9, 6, 4, 10, 11, 12, 12, 8, 7, 7, 10.

a) According to the experiment, what is the probability of rolling a **sum of 7**?

$P_e(\text{choosing 7}) = 4/16 = 1/4 = \boxed{25\%}$



b) What is the theoretical probability of rolling a **sum of 7**?

$P_t(\text{choosing 7}) = 6/36 = 1/6 \approx \boxed{17\%}$

c) What is the theoretical probability of rolling **sum of 7 or a sum less than 4**?

$P_t(\text{choosing 1/2/3/4/7}) = 9/36 = 1/4 = \boxed{25\%}$

Version 2

1. Myles is performing an experiment by rolling two dice. During his experiment he gets the following sums of rolls: 2, 5, 7, 7, 8, 9, 6, 4, 10, 11, 12, 12, 8, 7, 7, 10.

a) According to the experiment, what is the probability of rolling a **sum of 7**?

4/16 1/4 or 25%

b) What is the theoretical probability of rolling a **sum of 7**?

1 6 4 3
2 5 5 2
3 4 6 1

6/36 1/6 or 16.6̄%

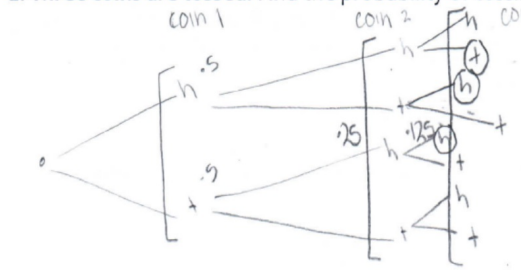
c) What is the theoretical probability of rolling **sum of 7 or a sum less than 4**?

1 1 2 1 3 4 6 1
1 2 1 6 4 3
2 5 5 2

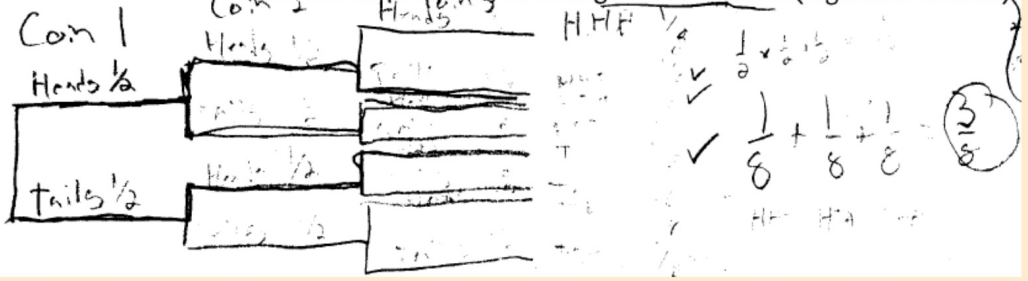
9/36 3/12 1/4 or 25%

Version 2

2. Three coins are tossed. Find the probability of tossing 2 heads and a tail (regardless of order).



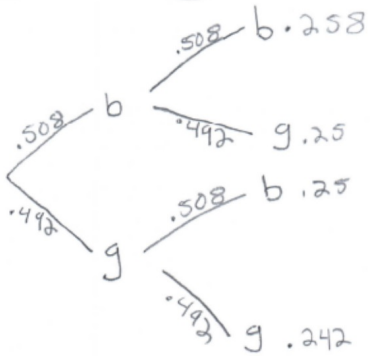
2. Three coins are tossed. Find the probability of tossing 2 heads and a tail (regardless of order).



Version 2

3. A family will have two children. Based on the proportion of men and women in the world, the probability of a boy is 50.8% and the probability of a girl is 49.2%.

a) Create a tree diagram to model the scenario. ***Label probabilities in decimal form to the thousandth place (0.001) on the branches AND at the end of each path.***



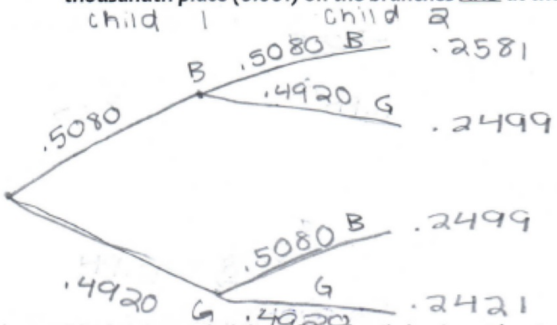
b) Find the probability of the family having at least one girl. **Round to the thousandth, 0.001.**

.25 + .25 + .242 ≈ .742 or 74.2% chance

Version 2

3. A family will have two children. Based on the proportion of men and women in the world, the probability of a boy is 50.8% and the probability of a girl is 49.2%.

a) Create a tree diagram to model the scenario. ***Label probabilities in decimal form to the thousandth place (0.001) on the branches AND at the end of each path.***



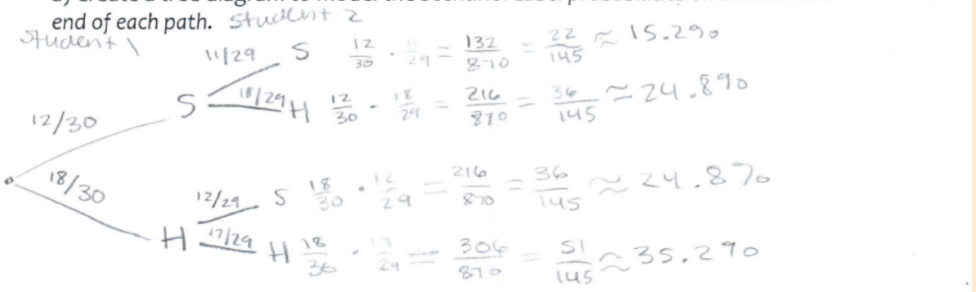
b) Find the probability of the family having at least one girl. **Round to the thousandth, 0.001.**

.2499 + .2499 + .2421 = .7419

Version 2

4. Two students each draw a piece of candy from a bag. In the bag, there are 12 Starbursts and 18 Hershey kisses. Students close their eyes and select one candy, and then eat it.

a) Create a tree diagram to model the scenario. *Label probabilities on the branches and at the end of each path.*



b) What is the probability that the first person **and** second person both choose a Hershey Kiss? HH $\frac{51}{145} \approx$ or 35.2% chance both pick Hersheys

c) Consider if the first student gets a piece of candy, and then puts it back in the bag as they decide they no longer want any candy. Now, what is the probability that the first person **and** second person both choose a Hershey Kiss?

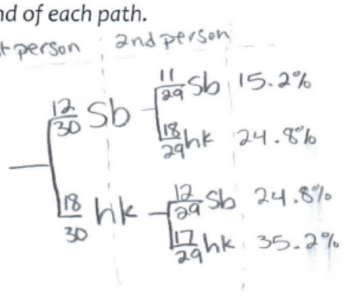
$\frac{18}{30} \cdot \frac{18}{30} = \frac{324}{900} = \frac{54}{150} = \frac{27}{75} = \frac{9}{25}$ or 36% chance they both choose them

5. State if each scenario involves a permutation or a combination. Then find the number of

Version 2

4. Two students each draw a piece of candy from a bag. In the bag, there are 12 Starbursts and 18 Hershey kisses. Students close their eyes and select one candy, and then eat it. without replacement

a) Create a tree diagram to model the scenario. *Label probabilities on the branches and at the end of each path.*



$\frac{12}{30} \cdot \frac{11}{29} = \frac{132}{870} \approx 15.2\%$

$\frac{12}{30} \cdot \frac{18}{29} = \frac{216}{870} \approx 24.8\%$

$\frac{18}{30} \cdot \frac{17}{29} = \frac{306}{870} \approx 35.2\%$

b) What is the probability that the first person **and** second person both choose a Hershey Kiss?

$\frac{306}{870} \approx 35.2\%$

c) Consider if the first student gets a piece of candy, and then puts it back in the bag as they decide they no longer want any candy. Now, what is the probability that the first person **and** second person both choose a Hershey Kiss?

$\frac{18}{30} \cdot \frac{18}{30} = \frac{324}{900} = 36\%$

Version 2

5. State if each scenario involves a permutation or a combination. Then find the number of possibilities.

a) There are 30 applicants for 3 computer programming positions.

Combination $\frac{30!}{(30-3)!\cdot 3!} = \frac{30\cdot 29\cdot 28\cdot 27\cdot\ldots}{(27\cdot 26\cdot 25\ldots)3!}$ $\frac{30\cdot 29\cdot 28}{6} = 4{,}060$

b) The student body of 80 students wants to elect a president, vice president, secretary, and treasurer. Permutation $\frac{80!}{(80-4)!} = \frac{80\cdot 79\cdot 78\cdot 77\cdot\ldots}{76\cdot 75\cdot 74\ldots}$ 37,957,920

5. State if each scenario involves a permutation or a combination. Then find the number of possibilities.

a) There are 30 applicants for 3 computer programming positions.

SAME JOB

COMBINATION $\frac{n!}{(n-r)!\cdot r!} = \frac{30!}{(30-3)!\cdot 3!} = \frac{30!}{27!\cdot 3!} = 4060 = 30\ C\ 3$

30 C 3 = 4060 POSSIBILITIES

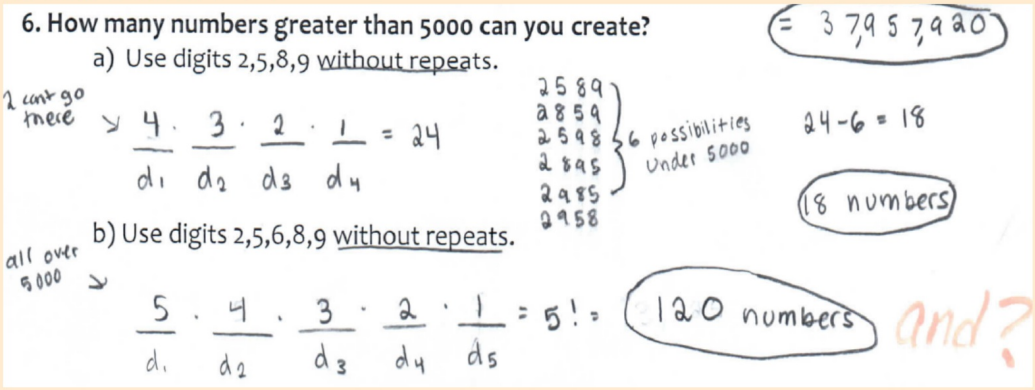
b) The student body of 80 students wants to elect a president, vice president, secretary, and treasurer.

PERMUTATION DIFFERENT JOBS

$\frac{80!}{(80-4)!} = \frac{80!}{76!} = 80\cdot 79\cdot 78\cdot 77 = 80\ P\ 4$

80 P 4 = 37,957,920 POSSIBILITIES

Version 2



and? 4-digit values over 5000!