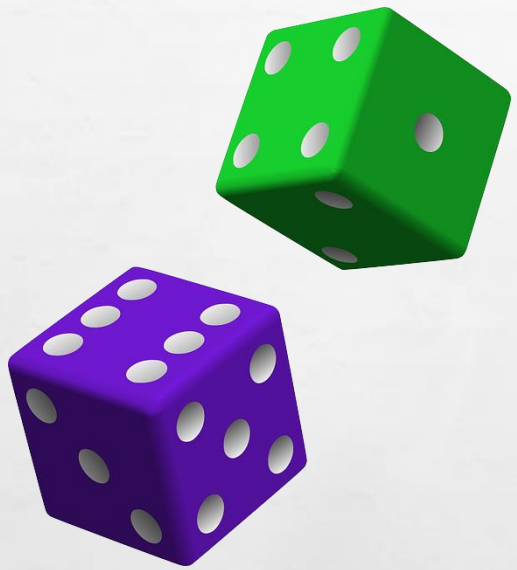

UNIT 1 DAY 9
PROBABILITY LAB

LET'S PLAY WITH DICE AND CARDS

WARM UP DAY 9

1. LET A AND B BE EVENTS SUCH THAT
$P(A \cap B) = 0.25 \quad P(A^c) = 0.4 \quad P(B) = 0.5$

A) WHAT IS $P(A \cup B)$?
B) WHAT IS $P(A^c \cap B^c)$?

Grab a Little Whiteboard for later! ☺

2. LIST THE EVENTS, E, OF GETTING TAILS FIRST OR LAST OR BOTH, IN 3 TOSSES OF A FAIR COIN? WHAT IS THE PROBABILITY OF E?

3. A MONTH IS CHOSEN FROM A YEAR. WHAT IS THE PROBABILITY OF CHOOSING A MONTH THAT STARTS WITH A J OR HAS EXACTLY 30 DAYS?

Remember to Pick up the Quiz #2 Review Handout from the crate if you missed it yesterday! ☺

RIDDLE: I TRAVEL ALL OVER THE WORLD, BUT ALWAYS STAY IN MY CORNER. WHAT AM I?

WARM UP ANSWERS

1. LET A AND B BE EVENTS SUCH THAT:

$P(A \cap B) = 0.25$ $P(A^C) = 0.4$ $P(B) = 0.5$

WHAT IS $P(A \cup B)$? **0.85**

WHAT IS $P(A^C \cap B^C)$? **0.15**

2. LIST THE EVENTS, E, OF GETTING TAILS FIRST OR LAST OR BOTH, IN 3 TOSSES OF A FAIR COIN? WHAT IS THE PROBABILITY OF E?

E = {HHT} , {HTT} , {THH} , {THT} , {TTH} ,{TTT}

P(E) = 6/8 = 3/4 = 0.75

3. A MONTH IS CHOSEN FROM A YEAR. WHAT IS THE PROBABILITY OF CHOOSING A MONTH THAT STARTS WITH A J OR HAS EXACTLY 30 DAYS?

3/12 + 4/12 – 1/12 = ½ or 0.50

RIDDLE OF THE DAY!

- I TRAVEL ALL OVER THE WORLD, BUT ALWAYS STAY IN MY CORNER. WHAT AM I?
- A STAMP!

HW QUESTIONS????

HW: FINISH

- QUIZ #2 REVIEW SHEET
- REVIEW QUIZ #1 AND PRE-ASSESSMENT
  → SOME QUIZ 2 TOPICS BUILD UPON THAT MATERIAL! ☺

WHITEBOARD PRACTICE

PRACTICE

4. IN THE MATH CLUB, 7 OF THE 20 GIRLS ARE SENIORS, AND 4 OF THE 14 BOYS ARE SENIORS. WHAT IS THE PROBABILITY OF RANDOMLY SELECTING A BOY OR A SENIOR TO REPRESENT THE MATH CLUB AT A STATEWIDE MATH CONTEST?

PRACTICE ANSWERS

4. IN THE MATH CLUB, 7 OF THE 20 GIRLS ARE SENIORS, AND 4 OF THE 14 BOYS ARE SENIORS. WHAT IS THE PROBABILITY OF RANDOMLY SELECTING A BOY OR A SENIOR TO REPRESENT THE MATH CLUB AT A STATEWIDE MATH CONTEST?

$14/34 + 11/34 - 4/34 = 21/34$

PRACTICE

5. GIVEN S = {6, 7, 8, 9, W, X, Y, Z}, A = {6, 8, X, Z}, AND B = {6, X, Y}

A) $A^c \cap B$

B) $A^c \cup B$

PRACTICE ANSWERS

5. GIVEN S = {6, 7, 8, 9, W, X, Y, Z}, A = {6, 8, X, Z}, AND B = {6, X, Y}

A) $A^c \cap B$ **= {Y}**

In {7, 9, W, Y} AND {6, X, Y}

B) $A^c \cup B$ **= {6, 7, 9, W, X, Y}**

{7, 9, W, Y} OR {6, X, Y}

PRACTICE

6. EVALUATE $F(X - 7) + 5$ GIVEN $F(X) = X^2 + 13$

PRACTICE ANSWERS

6. EVALUATE $F(X - 7) + 5$ GIVEN $F(X) = X^2 + 13$

$(x - 7)^2 + 13 + 5$

$(x - 7)(x - 7) + 18$ $= x^2 - 14x + 67$

EXTRA PRACTICE

7. A BAG OF CANDY CONSISTS OF 6 SNICKERS AND 12 TWIX. YOU DRAW 2 PIECES OF CANDY OUT OF THE BAG, ONE AFTER THE OTHER. WHAT IS THE PROBABILITY THAT YOU DRAW AT LEAST 1 TWIX?

EXTRA PRACTICE ANSWER

7. A BAG OF CANDY CONSISTS OF 6 SNICKERS AND 12 TWIX. YOU DRAW 2 PIECES OF CANDY OUT OF THE BAG, ONE AFTER THE OTHER. WHAT IS THE PROBABILITY THAT YOU DRAW AT LEAST 1 TWIX?

$$P(\geq 1 Twix) = 1 - P(none)$$

$$1 - \left(\frac{6}{18} \bullet \frac{5}{17}\right)$$

$$1 - \frac{5}{51} = 0.9020$$

$$P(T,T) + P(T,S) + P(S,T)$$

$$\frac{12}{18} \bullet \frac{11}{17} + \frac{12}{18} \bullet \frac{6}{17} + \frac{6}{18} \bullet \frac{12}{17}$$

$$0.431 + 0.235 + 0.235 = 0.9020$$

EXTRA PRACTICE

8. THE PROBABILITY OF A MUDSLIDE IN A PARTICULAR TOWN IN CALIFORNIA IS 12 PERCENT. WHAT IS THE PROBABILITY THEY WILL HAVE AT LEAST ONE MUDSLIDE IN THE NEXT TWENTY YEARS?

EXTRA PRACTICE ANSWERS

8. THE PROBABILITY OF A MUDSLIDE IN A PARTICULAR TOWN IN CALIFORNIA IS 12 PERCENT. WHAT IS THE PROBABILITY THEY WILL HAVE AT LEAST ONE MUDSLIDE IN THE NEXT TWENTY YEARS?

$$P(\text{at least 1 mudslide}) = 1 - P(none)$$

$$= 1 - (.88)^{20}$$

$$= 0.9224$$

EXTRA PRACTICE

9. FOR A SHIFT AT WORK, IN HOW MANY WAYS CAN YOU CHOOSE A MANAGER AND ASSISTANT MANAGER, 5 CASHIERS AND 3 STOCKERS. THERE ARE 4 MANAGERS,12 CASHIERS AND 8 STOCKERS ON STAFF.

EXTRA PRACTICE ANSWERS

9. FOR A SHIFT AT WORK, IN HOW MANY WAYS CAN YOU CHOOSE A MANAGER AND ASSISTANT MANAGER, 5 CASHIERS AND 3 STOCKERS. THERE ARE 4 MANAGERS,12 CASHIERS AND 8 STOCKERS ON STAFF.

$= {}_4P_2 * {}_{12}C_5 * {}_8C_3$

$= 12 * 792 * 56$

$= 532{,}224$

EXTRA PRACTICE

10. In how many ways can you rearrange “classrooms”?

EXTRA PRACTICE ANSWERS

10. In how many ways can you rearrange “classrooms”?

$$= \frac{10!}{(3!\ 2!)} = 302{,}400$$

REMINDERS ABOUT PROBABILITY

- **PROBABILITY** DESCRIBES THE CHANCE THAT AN UNCERTAIN EVENT WILL OCCUR.

$$\frac{\text{desired \#}}{\text{total \#}}$$

- NOTATION: P(E) MEANS PROBABILITY OF EVENT E OCCURRING.

Theoretical Probability = what *SHOULD* happen, in theory

$$\frac{\text{\# of ways desired event E occurs}}{\text{total \# in sample space}}$$

Empirical Probability = what *ACTUALLY happened* in an experiment

$$\frac{\text{\# of ways desired event E occurs}}{\text{\# of total trials}}$$

PROBABILITY LAB

- EACH PERSON MUST DO A LAB SHEET, BUT YOU WILL WORK WITH YOUR PARTNER.
- 1ST, FIND THE THEORETICAL PROBABILITIES FOR THE DICE AND CARDS.
- 2ND, BRING YOUR THEORETICAL ANSWERS TO ME TO CHECK.
- 3RD, ONE ROLLS/DRAWS AND THE OTHER PARTNER WRITES. THEN EACH RECORDS THE DATA.
- 4TH, FIND YOUR EMPIRICAL (EXPERIMENTAL) DATA ANSWERS AND COMPARE THEM TO THE THEORETICAL.

HW: FINISH

- QUIZ #2 REVIEW SHEET
- REVIEW QUIZ #1 AND PRE-ASSESSMENT
  → SOME QUIZ 2 TOPICS BUILD UPON THAT MATERIAL! ☺

CHANGED FORMAT OF LESSON STARTING SPRING 19

WARM UP DAY 8

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   WHAT IS $P(A \cup B)$? WHAT IS $P(A^c \cap B^c)$?

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5. GIVEN S = {6, 7, 8, 9, W, X, Y, Z}, A = {6, 8, X, Z}, AND B = {6, X, Y}

   A) $A^c \cap B$ B) $A^c \cup B$

6. EVALUATE $F(X - 7) + 5$ GIVEN $F(X) = X^2 + 13$

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9. FOR A SHIFT AT WORK, IN HOW MANY WAYS CAN YOU CHOOSE A MANAGER AND ASSISTANT MANAGER, 5 CASHIERS AND 3 STOCKERS. THERE ARE 4 MANAGERS,12 CASHIERS AND 8 STOCKERS
ON STAFF.

10. IN HOW MANY WAYS CAN YOU REARRANGE “CLASSROOMS”?