

Instructions: Show all work. Use exact answers unless specifically asked to round. Explain thoroughly using complete sentences.

1. What is the difference between an experimental probability and a theoretical probability? Give an example of each.

An experimental probability is the proportion of outcomes in the event relative to the total number of trials:

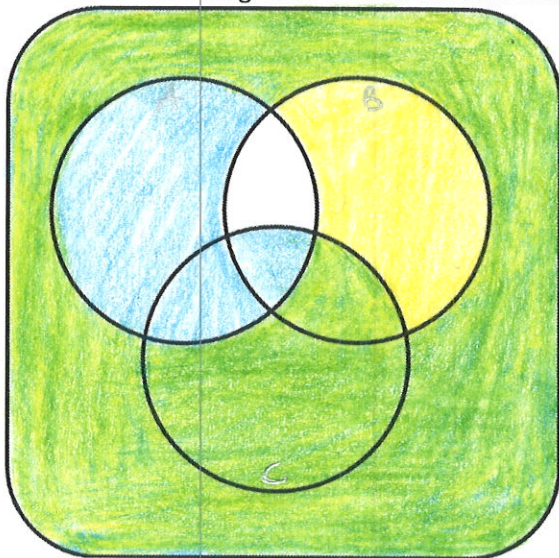
The number of heads that occur after 50 coin flips.

A theoretical probability considers the number of possible outcomes and the number in the events, assumes all are equally likely and finds the proportion of the events to the total outcomes possible.

2. List the sample space for three coin flips.

$\{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT\}$

3. Shade the Venn diagram below so that it shows the set $A' \cap (B' \cup C)$. Label your sets.

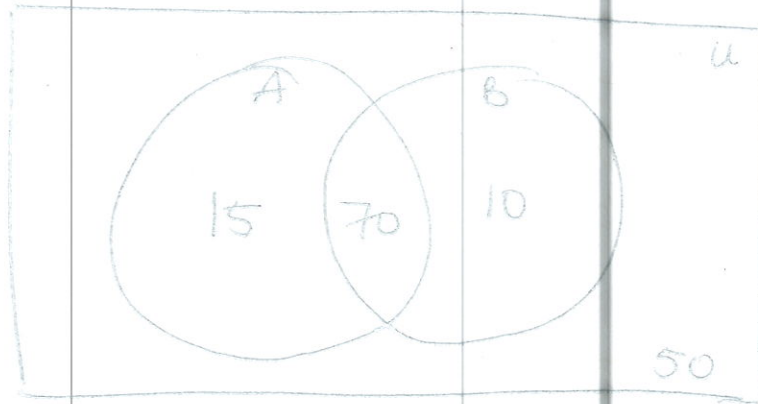


The green region is

$$A' \cap (B' \cup C)$$

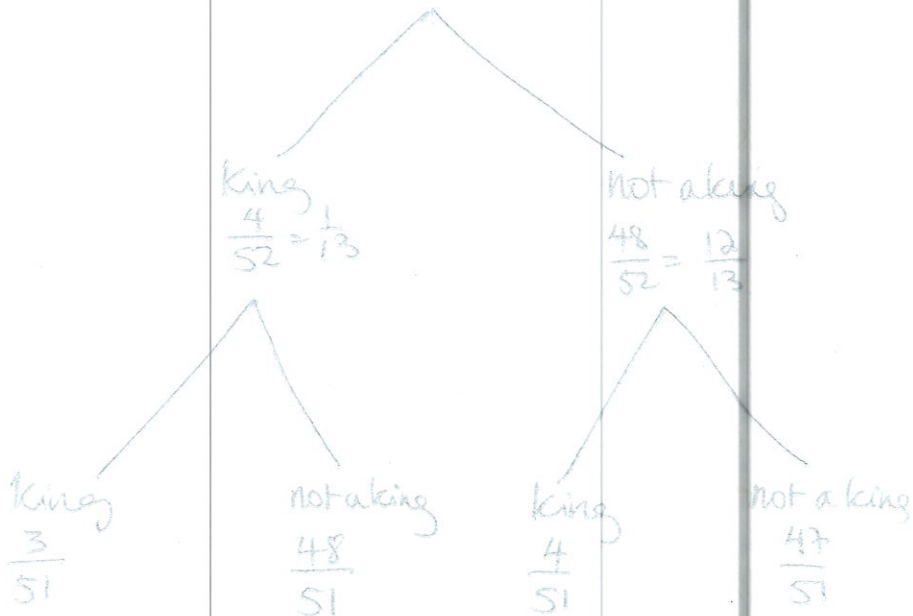
4. Convert the two-way table to a Venn diagram. Be sure to clearly state which set is which.

	Speak a Foreign Language	Do Not Speak a Foreign Language	Totals
Math Average ≥ 90	70	15	
Math Average NOT ≥ 90	10	50	
Totals			



$A = \text{Math Avg } \geq 90$
 $B = \text{Speak foreign language}$

5. You draw two cards from a standard deck. Construct a tree diagram to model the problem to determine the probability that one of the cards is a king.



$$P(\text{exactly one card is a king}) = \frac{1}{13} \left(\frac{48}{51} \right) + \frac{12}{13} \left(\frac{4}{51} \right) = \frac{32}{221} \approx .144796\dots$$

$$P(\text{at least one card is a king}) = \frac{32}{221} + \frac{4}{52} \left(\frac{3}{51} \right) = \frac{33}{221} \approx .14932\dots$$