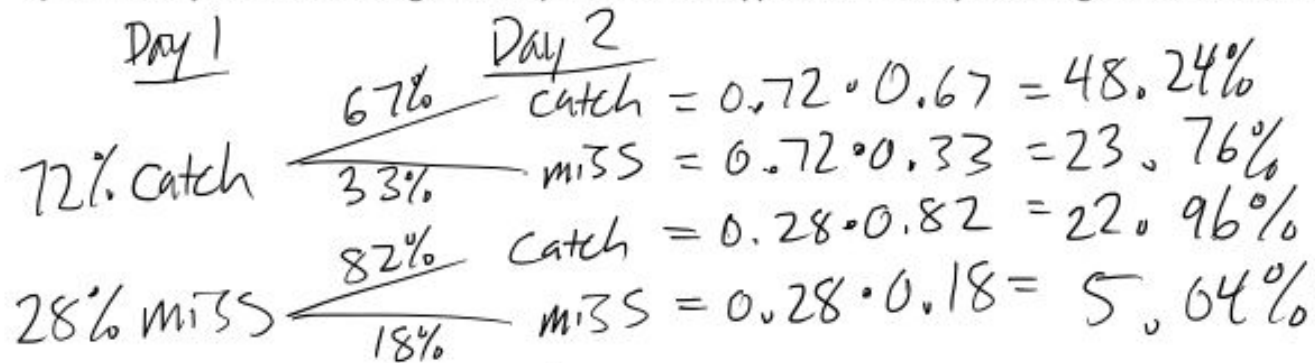


a) Draw a fully labelled tree diagram to represent what happens for two days of taking the bus to school.



b)  $P(\text{Catch both buses}) = 48.24\%$

c)  $P(\text{Miss one bus}) = 46.72\% = 23.76\% + 22.96\%$

d)  $P(\text{Miss at least one bus}) = 51.76\% = 23.76\% + 22.96\% + 5.04\%$

e)  $P(\text{Make 2<sup>nd</sup> bus} \mid \text{missed 1<sup>st</sup> bus}) = 82\%$

2. The following is a partial list of **odds for** each school winning the 2020 Vancouver Math Challengers Competition

<u>fav</u> : <u>un-fav</u>		
Lord Byng 1:4	Churchill 4:5	Prince of Wales 2:13

a) What is the probability of each team winning?

LB =  $\frac{1}{1+4} = \frac{1}{5} = 20\%$     Church =  $\frac{4}{4+5} = \frac{4}{9} = 44.44\%$     PW =  $\frac{2}{2+13} = \frac{2}{15} = 13.33\%$

b) If Tupper has an 8% chance of winning, what are the odds against them winning, in lowest terms?

unfav : fav

$92 : 8 \Rightarrow \boxed{23 : 2}$

	Math (M)	English (E)	Total
Snowboard (Snow)	14	7	21
Ski (Ski)	6	3	9
Total	20	10	30

$$a. P(\text{Ski} \cap E) = \frac{3}{30}$$

$$b. P(\text{Snow} \cup M) = \frac{27}{30}$$

$$c. P(\text{Ski} | E') = \frac{6}{20}$$

$$d. P(M' \cap \text{Ski}) = \frac{7}{30}$$

e. In this group, are teaching English and snowboarding independent? Explain.

$$P(E) \stackrel{?}{=} P(E | \text{Snow})$$

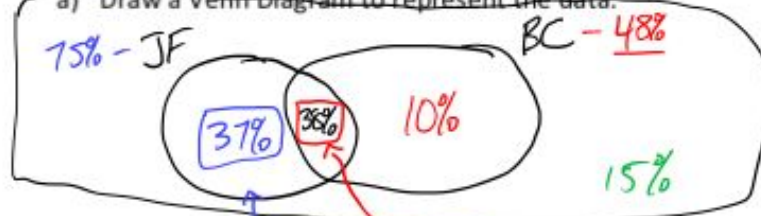
$$\frac{10}{30} = \frac{7}{21} \Rightarrow \frac{1}{3} \neq \frac{1}{3} \text{ Independent!}$$

f. In this group, are teaching English and snowboarding mutually exclusive? Explain

*NO, there are teachers that teach english and snowboard*  
 $P(E \cap \text{Snow}) \neq 0$

4. A survey done at Lord Byng during a donut sale had the following results

a) Draw a Venn Diagram to represent the data.



75% liked Jelly-Filled donuts  
 48% liked Boston Cream donuts  
 15% liked neither

b) What is the probability that a randomly selected person liked both?  $P(JF \cap BC) = 100\% - 15\% = 85\%$   
 $P(JF \cup BC) = P(JF) + P(BC) - P(JF \cap BC)$   
 $85\% = 75\% + 48\% - x$   
 $x = 75\% + 48\% - 85\% = 38\%$

c) What is the probability that a randomly selected person liked Jelly-Filled but not Boston Cream?  
 $75\% - 38\% = 37\%$

d) Based on the data given, is liking Jelly-Filled and Boston Cream independent? Mathematically justify your answer.  
 $P(JF \cap BC) \stackrel{?}{=} P(JF) \cdot P(BC)$   
 $38\% \stackrel{?}{=} 75\% \cdot 48\%$   
 $38\% \neq 36\%$  not independent

e) Given that a randomly selected person liked Boston Cream, what is the probability they also like Jelly-Filled?  
 $P(JF | BC) = \frac{38\%}{38\% + 10\%} = 79.17\%$