

Name: \_\_\_\_\_

## Foundations 12: Probability Practice Test

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cap B) = P(A) \cdot P(B|A)$$

Full credit will only be awarded for all work shown in a neat and organized manner.

For probabilities, answer with percentages to 2 decimal places, if needed (e.g. 14.56%)

1. A student at Lord Byng that takes the bus to school misses their bus 28% of the time. If they miss the bus, the next day they are 10% less likely to miss the bus (because they get ready a bit faster). If they catch the bus, the next day they are 5% less likely to catch the bus (because they get complacent).

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

b) P(Catch both buses) = \_\_\_\_\_

c) P(Miss one bus) = \_\_\_\_\_

d) P(Miss at least one bus) = \_\_\_\_\_

e) P(Make 2<sup>nd</sup> bus | missed 1<sup>st</sup> bus) = \_\_\_\_\_

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

Lord Byng 1:4

Churchill 4:5

Prince of Wales 2:13

a) What is the probability of each team winning?

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

3. In a group of 30 teachers at a staff meeting, 20 teach math and 14 of those math teachers snowboard (the rest ski). The rest of the teachers teach English and 3 of those teachers ski.

*(Leave answers a. to d. as fractions. You don't need to reduce them)*

	Math (M)	English (E)	Total
Snowboard (Snow)			
Ski (Ski)			
Total			30

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

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

c.  $P(\text{Ski} \mid \text{E}') =$

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

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

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

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?

c) What is the probability that a randomly selected person liked Jelly-Filled but not Boston Cream?

d) Based on the data given, is liking Jelly-Filled and Boston Cream independent? Mathematically justify your answer.

e) Given that a randomly selected person liked Boston Cream, what is the probability they also like Jelly-Filled?