GRADE 12 APPLIED Name: _____
PROBABILITY – DEPENDENT AND INDEPENDENT Date: _____

1. Indicate which of the following are independent events and which are dependent events.

    a. Removing (selecting randomly) three red marbles without replacement from a bag that contains six red and nine blue marbles.

    b. Selecting a red card from a deck of cards, returning the card to the deck, shuffling the cards, and selecting a second red card.

    c. Rolling two dice.

    d. The weather and how likely you are to go visiting. You have decided that there is a 50% chance that you will visit your friend if it does not snow, and a 10% chance if it does snow.

2. At the race track one afternoon; the probability that Gallant Fox will win the first race is 2/5 and that Nashau will win the second race is 1/3.

    a. What is the probability that both horses will win their respective races?

    b. What is the probability that both horses will lose their respective races?

    c. What is the probability that **at least** one horse will win a race?

3. The probability that Tony will move to Winnipeg is 2/9, and the probability that he will marry Angelina if he moves to Winnipeg is 9/20. The probability that he will marry Angelina if he *does not* move to Winnipeg is 1/20.

   Draw a tree diagram to show all outcomes.

   a. What is the probability that Tony will move to Winnipeg and marry Angelina?

   b. What is the probability that Tony does not move to Winnipeg but does marry Angelina?

   c. What is the probability that Tony does not move to Winnipeg and does not marry Angelina?

4. You have bought tickets at two unrelated (independent) raffles. The probability of winning the first one is 0.002, and the probability of winning the second one is 0.015. Find the probability of winning at least one prize.

5. There are nine people that make up a recreational baseball team, and they are selecting people to play the different positions.

    a. In how many ways can the positions be filled if there are no restrictions on who plays which position?

    b. What is the probability that Al is selected to be the pitcher if all positions are selected randomly?

    c. What is the probability that Al, Bert, or Cal are selected to be pitcher if all positions are selected randomly?

    d. What is the probability that Al, Bert, or Cal are pitcher, and Dan or Ed are catcher if all positions are selected randomly?

6. Jeff drives to school each day, and on the way he must go through two traffic lights. He is trying to determine whether the lights are working independently. On his next 40 trips to school, Jeff stops 30 times at the first light, 16 times at the second, and 12 times at both. Should Jeff conclude that the lights are working independently? Explain.

7. In Midlake High School, 30% of the students own a graphing calculator and 50% of the students own a cell phone. We will assume that owning a graphing calculator and a cell phone are independent events.

Draw the probability Tree:

a. A student is selected at random. What is the probability that this student does not own a graphing calculator or a cell phone?

b. Two students are selected at random. What is the probability that the first one selected owns a graphing calculator (and no cell phone) and the second one selected owns a cell phone (and no graphing calculator)?

c. Five students are selected randomly. What is the probability that at least one student has a cell phone?

8. In the previous question, we discovered that 30% of the students own a graphing calculator and 50% of the students own a cell phone. A survey done by the math students determined that 25% of the students own both a graphing calculator and a cell phone. Based on this information, are owning a graphing calculator and a cell phone independent events? How do you know?