Statistical Reasoning
7.3 – Tree Diagrams and Conditional Probability

Name:

The probability that one event happens under the condition that another event is already known to have happened is called a **conditional probability**. Suppose we know that event A has happened; then the probability that event B happens *given that* event A has happened is denoted by $P(B|A)$.

	Sport Utility Vehicle (SUV)	Sports Car	Totals
male	21	39	60
female	135	45	180
Totals	156	84	240

MathBits.com

Find the following *(round all probabilities to the nearest hundredth)*:

1) $P(male)$ $\frac{60}{240} = .25$

2) $P(Male \cup SUV)$ $\frac{60+156-21}{240} = \frac{195}{240} = .81$

3) $P(Male \cap SUV)$ $\frac{21}{240} = .09$

4) $P(male|SUV)$ $\frac{21}{156} = .13$

5) $P(SUV|male)$ $\frac{21}{60} = .35$

Events A and B are **independent** if the occurrence of one event has no effect on the change that the other event will occur. *(Two mutually exclusive events can never be independent because if one event happens, the other is guaranteed not to happen).*

Determine whether the following are independent events.

1) Winning the lottery and running out of milk. independent

2) Parking illegally and getting a parking ticket. not independent (dependent)

3) A box contains 44 red marbles, 33 green marbles and 22 blue marbles. One marble is removed from the box and then replaced. Another marble is drawn from the box. Event A: drawing a red marble first. Event B: drawing a blue marble second.

independent

4) 3) A box contains 44 red marbles, 33 green marbles and 22 blue marbles. One marble is removed from the box and is not replaced. Another marble is drawn from the box. Event A: drawing a red marble first. Event B: drawing a blue marble second.

not independent (dependent)

5) A coin landing on heads after tossing it and rolling a 5 on a single 6-sided die.

independent