**Probability rules worksheet NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. If P(A) = 0.26 and P(B) = 0.41 and P(A∩B) = 0.1, find the following:
   1. P(A U B) = 0.26 + 0.41 – 0.10 = 0.57
   2. P(B|A) = 
   3. Are A and B disjoint events? Why or why not?

No. P(A∩B) = 0.1 ≠ 0

* 1. Are A and B independent events? Why or why not?

No. P(B|A) = 0.3846 ≠ P(B) = 0.41

1. If P(G) = 0.42, P(M) = 0.33 and G and M are independent, what’s the probability of G and M?

P(G∩M) = (0.42)(0.33) = 0.1386

1. If P(W) = 0.6 and P(J) = 0.34 and P(J|W) = 0.2, find the following:
   1. P(W and J) = P(W ∩ J) = P(W)∙P(J|W) = (0.6)(0.2) = 0.12
   2. P(W or J) = P(W U J) = 0.6 + 0.34 – 0.12 = 0.82
2. If P(Y) = 0.45 and P(L) = 0.60 and P(Y ∩ L) = 0.22, find the following:
   1. P(Y U L) = 0.45 + 0.60 – 0.22 = 0.83
   2. P(L|Y) =

* 1. Are Y and L disjoint events? Why or why not?

No. P(Y ∩ L) = 0.22 ≠ 0

* 1. Are Y and L independent events? Why or why not?

No. P(L|Y) = 0.4889 ≠ P(L) = 0.60

1. If P(D) = 0.32, P(R) = 0.13 and D and R are disjoint, what is the probability of D or R?

P(D U R) = 0.32 + 0.13 = 0.45

1. If P(T) = 0.51 and P(B) = 0.28 and P(B|T) = 0.18, find the following:
   1. P(T and B) = P(T)∙P(B|T) = (0.51)(0.18) = 0.0918
   2. P(T or B) = 0.51 + 0.28 – 0.0918 = 0.6982
2. Suppose in a lab 24% of the mice are albino, 56% are brown, and the rest are grey.
   1. What is the probability that a randomly selected mouse is:
      1. Grey

P(G) = 0.20

* + 1. Not albino

P(AC) = 0.76

* + 1. Grey or Albino

P(G U A) = 0.44

* 1. If the type of mouse is independent of the next what is the probability that:
     1. 2 randomly selected mice are both brown?

P(B ∩ B) = (0.56)(0.56) = 0.3136

* + 1. 2 randomly selected mice are albino then brown?

P(A ∩ B) = (0.24)(0.56) = 0.1344

* + 1. 2 randomly selected mice are albino and grey?

P(A ∩ G) = (0.24)(0.20)\*2 = 0.096

* + 1. 2 randomly selected mice are not grey?

P(GC ∩ GC) = (0.80)(0.80) = 0.64

* + 1. At least 1 out of 4 randomly selected mice is albino?

P(at least 1 A out of 4) = 1 – P(AC ∩ AC ∩ AC ∩ AC) = 1 – (0.76)4 = 0.6664

* + 1. The first albino mouse is the 5th one selected?

P(AC ∩ AC ∩ AC ∩ AC ∩ A) = (0.76)4(0.24) = 0.0801

1. In the parking lot of the a large mall 64% of cars are foreign made, 12% are the color blue and 7.7% are blue and foreign made cars.

.077

.563

.043

.317

F

B

1. Draw a Venn Diagram
2. What is the probability that a randomly selected car was:
3. A foreign car or a blue car?

P(F U B) = 0.683

1. Not a foreign car and a blue car?

P(FC ∩ B) = .043

1. A foreign car given it was blue?

P(F|B) = 

1. Not blue given it was not a foreign car?

P(BC|FC) = 

1. Is being a foreign car and being blue mutually exclusive? independent?

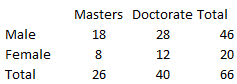
Not Mutually Exclusive because P(F ∩ B) = 0.077 ≠ 0

Independent because P(F|B) = P(F)

0.6427 = 0.64

1. The following table shows the breakdown of sex and degree among a university’s faculty.

What is the probability that a randomly selected professor is

1. Male and has a Doctorate

P(M ∩ D) = 

1. Male or has a Doctorate

P(M U D) = 

1. Is a Male given they have a Doctorate

P(M|D) = 

1. A female with a Masters degree

P(M|F) = 

1. Is sex and degree independent? Disjoint?

Independent: Yes. P(M|D) = 0.70 = P(M) = 0.6970

Disjoint: No. P(M ∩ D) = 0.4242 ≠ 0