Math 163 – Contingency Tables Worksheet

To simplify matters, let's assume that students at Interurban are enrolled in either Technology or Business (but not both). Let's also assume that men and women are equally represented in Business, but that only 10% of Technology students are women (which, frankly, is being generous!). Let's also assume that there are the same number of Technology and Business students. Then our entire student population of 100 (to make the numbers easier) would look like this:

	Technology	Business	Total
Male	45	25	70
Female	5	25	30
Total	50	50	100

Calculate the probability that if a student were randomly selected from this group,

1. that the student was enrolled in Technology;

$$P(T) = \frac{n(T)}{n} = \frac{50}{100} = \frac{1}{2} \text{ or } 50\%$$

2. that the student was a male business student;

$$P(MB) = \frac{n(MB)}{n} = \frac{25}{100} = \boxed{\frac{1}{4} \text{ or } 25\%}$$

3. that the student was male or in business;

see next page

4. that if the student were female, that she was enrolled in Technology;

$$P(T|F) = \frac{n(FT)}{n(F)} = \frac{5}{30} = \frac{1}{6}$$

5. that if the student were in Technology, that she were female.

$$P(F|T) = \frac{n(FT)}{n(T)} = \frac{5}{50} = 10\% \text{ or } \frac{1}{10}$$

Are the events "student is female" and "student is enrolled in Technology" independent? Explain your answer.

Compare: $P(F) \stackrel{?}{=} P(F|T)$

$\frac{30}{100} \stackrel{?}{=} 10\%$ No!

or $P(T) \stackrel{?}{=} P(T|F)$

$50\% \stackrel{?}{=} \frac{1}{6}$ No!

$\therefore$ they are dependent

#3: $P(M \text{ or } B) = P(M) + P(B) - P(MB)$

$$= \frac{70}{100} + \frac{50}{100} - \frac{25}{100}$$

$$= \frac{95}{100} = 95\%$$

or $P(M \text{ or } B) = \dfrac{n(M \text{ or } B)}{n}$

$$= \frac{n(MT) + n(MB) + n(FB)}{n}$$

$$= \frac{45 + 25 + 25}{100} = 95\%$$

or $P(M \text{ or } B) = 1 - P(FT)$

$$= 1 - 5/100$$

$$= 95\%$$