

## Introductory Statistics Tutorial

### Chapter 4 – Probabilities and Proportions

1. In 1995 there were 2011 students enrolled in either 528.181 or 528.188 (Stage I Statistics) at the City campus. The numbers of female and male students are given in the following table.

	Females	Males	Total
528.181	604	593	1197
528.188	387	427	814
<b>Total</b>	991	1020	2011

- (a) Convert the above table of counts into a probability table (to 4 decimal places).

	Females	Males	Total
528.181			
528.188			
<b>Total</b>			

- (b) One of the 2011 students is chosen at random. What is the probability that the student chosen is:

(i) a male taking 528.181?

(ii) a female?

(iii) a female taking 528.188?

(c) Given that a student is taking 528.188, what is the probability that they are male?

(d) What is the probability that a randomly chosen male student is taking 528.188?

2. Consider drivers stopped at random for breath testing. Below is a partially completed probability table providing information about such drivers, with regards to their age (40 or under, over 40) and whether they were (or were not) wearing seat belts.

	40 or under	Over 40	Total
Wearing a seat belt	0.484		0.853
Not wearing seat belt		0.081	
<b>Total</b>			1

(a) Complete the table.

(b) What is the probability that a driver stopped at random is not wearing a seat belt?

(c) If a driver stopped at random is not wearing a seat belt, then what is the probability the driver is over 40?

(d) What is the probability that a driver stopped at random is 40 or under?

3. The medical records of a group of diabetic patients presenting at a clinic showed that 50 presented as serious cases, while 36 presented as mild cases. Of the 31 patients aged under 40, 16 presented as mild cases.

(a) Present this information in the table below.


(b) A patient is chosen at random. Find the probabilities that:

(i) the patient is under 40 and has a mild case.

(ii) the patient is at least 40 years old or has a serious case.

(iii) the patient has a serious case and is at least 40 years old.

(c) Of those presenting with serious cases, what proportion are aged under 40?

(d) Of those aged at least 40, what proportion present with mild cases?

4. A bank classifies borrowers as high-risk or low-risk. Of all its loans, 5% are in default. Forty percent (40%) of those loans in default are to high-risk borrowers, while 77% of loans not in default are to low-risk borrowers.

(a) Complete the table.


(b) What percentage of loans is made to borrowers in the high-risk category?

(c) What is the probability that a high-risk borrower will default on his or her loan?

5. According to recent figures from the National Centre of Educational Statistics (US), 17.5% of all bachelor's degrees are in business. 27% of bachelor's degrees in business are obtained by women and 48.75% of other degrees are obtained by men.

(a) Complete the table.


- (b) What is the probability that a randomly selected recent bachelor's degree graduate will be a man?
- (c) What is the probability that a randomly selected recent bachelor's degree graduate will be a man with a degree in business?
- (d) What is the probability that a randomly selected female recent bachelor's degree graduate will have a degree in business?

6. (1998 Semester 1 Term Test)

A drinking pattern found by a survey is that 19% of male drinkers and 10% of female drinkers drink alcohol daily. Also, 51% of all drinkers are male (a 'drinker' was defined as someone who had consumed alcohol in the previous 12 months).

The probability that a randomly selected drinker from this survey who drinks alcohol daily is female is:

- (1) 0.3448
- (2) 0.3358
- (3) 0.0490
- (4) 0.1459
- (5) 0.2041