

Section 4 – 3A: Contingency Tables Introduction

A local school has a **Varsity** and **Junior Varsity** basketball team. **No player plays on both teams and no player plays at more than one position.** The coach writes down the team and position for each of the **25 players** on the teams.

Varsity Guard	Jr. Varsity Forward	Jr. Varsity Guard	Varsity Forward
Jr. Varsity Guard	Varsity Forward	Jr. Varsity Forward	Varsity Forward
Varsity Center	Jr. Varsity Forward	Varsity Forward	Jr. Varsity Guard
Jr. Varsity Center	Jr. Varsity Guard	Varsity Center	Jr. Varsity Forward
Jr. Varsity Guard	Jr. Varsity Forward	Jr. Varsity Guard	Varsity Guard
Varsity Forward	Jr. Varsity Forward	Jr. Varsity Forward	Varsity Guard
Jr. Varsity Forward			

The Coach then sorts the 25 players into separate teams and positions

Varsity Guard	Varsity Forward	Varsity Center
Varsity Guard	Varsity Forward	Varsity Center
Varsity Guard	Varsity Forward	
	Varsity Forward	
	Varsity Forward	
Jr. Varsity Guard	Jr. Varsity Forward	Jr. Varsity Center
Jr. Varsity Guard	Jr. Varsity Forward	
Jr. Varsity Guard	Jr. Varsity Forward	
Jr. Varsity Guard	Jr. Varsity Forward	
Jr. Varsity Guard	Jr. Varsity Forward	
Jr. Varsity Guard	Jr. Varsity Forward	
	Jr. Varsity Forward	
	Jr. Varsity Forward	

This data would be easier to view if we created a **frequency table**.

	Guards	Forwards	Centers	Total
Varsity Team	3	5	2	10
Jr. Varsity Team	6	8	1	15
Total	9	13	3	25

The table above is a **2 way frequency table** that shows the **team frequencies by position in the horizontal rows** and the **position frequencies by team in the vertical rows**. The **team totals are displayed at the far right** of each row and the **position totals are displayed at the bottom** of each row.

We call this 2 Way Frequency Table a Contingency Table

Reading Frequencies and Totals in a Contingency Table

The cells in the **bottom row** of the table contain the **totals for each of the different Column Variables**. The cells in the **far right column** contain the totals for **each of the different Row Variables**.

	Column Variable 1	Column Variable 2	Column Variable 3	Row Totals
Row Variable 1	Frequency of R1 and C1	Frequency of R1 and C2	Frequency of R1 and C3	Total of Row 1 Frequencies
Row Variable 2	Frequency of R2 and C1	Frequency of R2 and C2	Frequency of R2 and C3	Total of Row 2 Frequencies
Column Totals	Total of Column 1 Frequencies	Total of Column 2 Frequencies	Total of Column 3 Frequencies	Total of all the Row Frequencies or the Total of all the Column Frequencies

The cells in the “**body of the table**” contain the **frequencies for each cell** that have **BOTH** the Row attribute AND the Column attribute.

	Column Variable 1	Column Variable 2	Column Variable 3	Row Totals
Row Variable 1	Frequency of R1 and C1	Frequency of R1 and C2	Frequency of R1 and C3	Total of Row 1 Frequencies
Row Variable 2	Frequency of R2 and C1	Frequency of R2 and C2	Frequency of R2 and C3	Total of Row 2 Frequencies
Column Totals	Total of Column 1 Frequencies	Total of Column 2 Frequencies	Total of Column 3 Frequencies	Total of all the Row Frequencies or the Total of all the Column Frequencies

Reading the Frequency Table

Example

	Guards	Forwards	Centers	Total
Varsity Team	3	5	2	10
Jr. Varsity Team	6	8	1	15
Total	9	13	3	25

Reading the Frequency Table Totals

	Guards	Forwards	Centers	Total
Varsity Team	3 players are V and G	5 players who are V and F	2 players who are V and C	Total number of Varsity Players is 10
Jr. Varsity Team	8 players who are JV and G	8 players who are JV and F	1 player who is JV and C	Total number of Jr. Varsity Players is 15
Total	Total number of Guards is 9	Total number of Forwards is 13	Total number of Centers is 3	Total number of all Players is 25

Reading the Frequency Table Data Cells

Example

	Guards	Forwards	Centers	Total
Varsity Team	3	5	2	10
Jr. Varsity Team	6	8	1	15
Total	9	13	3	25

	Guards	Forwards	Centers	Total
Varsity Team	3 players are V and G	5 players who are V and F	2 players who are V and C	Total number of Varsity Players is 10
Jr. Varsity Team	8 players who are JV and G	8 players who are JV and F	1 player who is JV and C	Total number of Jr. Varsity Players is 15
Total	Total number of Guards is 9	Total number of Forwards is 13	Total number of Centers is 3	Total number of all Players is 25

Extra Lecture Notes

Reading Frequencies in a Two Way Frequency Table

The **Contingency Tables** in this unit requires that each player play on **only one team** and at **only one position**. Diagrams where a player plays on more than one team or plays more than one position will be covered in Section 4.

Each cell that is at the **intersection of a ROW Heading AND column Heading** has the attributes of BOTH the Row and Column headings at the same time.

The number found in the **single cell** that is at the **intersection of the a Heading AND a Column Heading** is the frequency or number of people who have attribute of BOTH the Row and Column headings. **Each player has EXACTLY ONE Column attribute and One Row Attribute**

	Guards	Forwards	Centers	Total
Varsity Team	3	5	2	10
Jr. Varsity Team	6	8	1	15
Total	9	13	3	25

The **intersection** of **Varsity Team row AND the Guards column** contains a **3**

There are 3 players who are both a **Varsity player AND a Guard**

The **intersection** of the **Varsity Team row AND the Forward column** contains a **5**

There are 5 players who are both a **Varsity player AND a Forward**

The **intersection** of the **Varsity Team row AND the Centers column** contains a **2**

There are 2 players who are both a **Varsity player AND a Center**

The **intersection** of the **Jr. Varsity Team row AND the Guards column** contains a **6**

There are 6 players who are both a **Jr. Varsity player AND a Guard**

The **intersection** of the **Jr. Varsity Team row AND the Forward column** contains a **8**

There are 8 players who are both a **Jr. Varsity player AND a Forward**

The **intersection** of the **Jr. Varsity Team row AND the Centers column** contains a **1**

There is 1 player who is both a **Jr. Varsity player AND a Center**

Reading the Row and Column Frequency Totals for a Two Way Frequency Table

The cells in the bottom row of the table contain the totals for each of the different Column Variables.
The cells in the far right column contain the totals for each of the different Row Variables.

	Guards	Forwards	Centers	Total
Varsity Team	3	5	2	10
Jr. Varsity Team	6	8	1	15
Total	9	13	3	25

There are a **total** of 9 guards **9** (found at the bottom of the Guards column)
A **Guard** can be a Varsity Guard **OR** a Jr. Varsity Guard.

There are a **total** of 13 forwards **13** (found at the bottom of the Forwards column)
A **Forward** can be a Varsity Forward **OR** a Jr. Varsity Forward.

There are a **total** of 3 centers **3** (found at the bottom of the Centers column)
A Center can be a Varsity Center **OR** a Jr. Varsity Center

There are a total of 10 Varsity players **10** (found at the far right of the Varsity row)
A **Varsity player** can be a Varsity Guard **OR** a Varsity Forward **OR** a Varsity Center.

There are a total of Jr. Varsity 15 players **15** (found at the far right of the Jr. Varsity row)
A Jr. **Varsity player** can be a Jr. Varsity Guard **OR** a Jr. Varsity Forward **OR** a Jr. Varsity Center.

There are a total of 25 players **25** (found at the bottom right corner of the table)

The Total of ALL players on any team at any position is 25