

Section 4 – 3D:

Complement Notation

$$P(G) = P(\text{Guard})$$

The BLUE cells below represent the frequency cells for players that are Guards

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

$$P(\text{Guard}) = \frac{\text{the number of players that are guards}}{\text{the total number of players}} = \frac{3+6}{25} = \frac{9}{25} = .36$$

The complement notation $P(\overline{G}) = P(\overline{\text{Guards}})$

$\overline{\text{Guards}}$ is called the Complement of Guards.

$\overline{\text{Guards}}$ is read **NOT Guards**. **NOT Guards** is written as the word Guard with a line over it.

$\overline{\text{Guards}}$ represents all the frequency cells that are **NOT Guards**

The **Red** cells below represent the frequency cells for players that are **NOT Guards**.

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

$$P(\overline{\text{Guards}})$$

What is the probability that if I select one player I will get a player that is **NOT A Guard**

$$P(\overline{\text{Guards}}) = \frac{\text{the number of players that are NOT guards}}{\text{the total number of players}} = \frac{5+2+8+1}{25} = \frac{16}{25} = .64$$

Example 1

$$P(\overline{\text{Centers}})$$

$\overline{\text{Centers}}$ represents all the frequency cells that are NOT Centers. **The Red cells below represent all the frequency cells for players that are NOT Centers.**

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

$$P(\overline{\text{Centers}}) = \frac{\text{the number of players that are NOT centers}}{\text{the total number of players}} = \frac{3+6+5+8}{25} = \frac{22}{25} = .88$$

Example 2

$$P(\overline{\text{Varsity}})$$

$\overline{\text{Varsity}}$ represents all the frequency cells that are NOT Varsity. **The RED cells below represent all the frequency cells for players that are NOT Varsity**

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

$$P(\overline{\text{Varsity}}) = \frac{\text{the number of players that are NOT varsity}}{\text{the total number of players}} = \frac{6+8+1}{25} = \frac{15}{25} = .60$$

Example 3

$$P(\overline{\text{Varsity Center}})$$

The Red cells represent all the frequency cells for players that are **NOT Varsity Centers**

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

$$P(\overline{\text{Varsity Center}}) = \frac{\text{the number of players that are NOT Varsity Centers}}{\text{the total number of players}} = \frac{3 + 5 + 6 + 8 + 1}{25} = \frac{23}{25} = .92$$

Complement Notation with Or

Example 4

$$P(\overline{(\text{Jr. Varsity or Forwards})})$$

The Red cells represent all the frequency cells for players that are **NOT (Jr. Varsity OR Forwards)**

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

$$= \frac{P(\overline{(\text{Jr. Varsity or Forwards})})}{\text{the total number of players}} = \frac{3 + 2}{25} = \frac{5}{25} = .20$$

Example 5

$$P(\overline{(\text{Jr. Varsity Team or Guards})})$$

The Red cells represent all the cells for players that are **NOT (Jr. Varsity OR Guards)**

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

$$P(\overline{(\text{Jr. Varsity Team or Guards})})$$

$$= \frac{\text{the number of players that are NOT (Jr. Varsity or Guards)}}{\text{the total number of players}} = \frac{5 + 2}{25} = \frac{7}{25} = .28$$

Example 6

$$P(\overline{(\text{Guard OR Center})})$$

The Red cells represent all the cells for players that are **NOT (Guards OR Centers)**

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

$$P(\overline{(\text{Guard OR Center})})$$

$$= \frac{\text{the number of players that are NOT (Guards or Centers)}}{\text{the total number of players}} = \frac{5 + 8}{25} = \frac{13}{25} = .52$$

Example 7

$$P(\overline{\text{Varsity Team OR Forward}})$$

The Red Cells are the cells that are **NOT (Varsity Players OR Forwards)**

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

$$P(\overline{\text{Varsity Team OR Forward}})$$

$$= \frac{\text{the number of players that are NOT (Varsity Players or Forwards)}}{\text{the total number of players}} = \frac{6+1}{25} = \frac{7}{25} = .28$$