## **Probability Spaces**

The data table below gives data for 103,870 women on their current and past marital status.

If one of these women were chosen at random, the probability of finding a married woman between the ages of 18 and 29 is...

P(18-29 & Married) = 7,842/103,870 ≈ .0755

	Age			
	18–29	30-64	65 and over	Total
Married	7,842	43,808	8,270	59,920
Never married	13,930	7,184	751	21,865
Widowed	36	2,523	8,385	10,944
Divorced	704	9,174	1,263	11,141
Total	22,512	62,689	18,669	103,870

**TABLE 6.1** Age and marital status of women (thousands of women)

Source: Data for 1999 from the 2000 Statistical Abstract of the United States.

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P(Widow who is 65 and over) = 8,385/103,870 =
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P(Married) = 59,920/103,870 =

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P(30-64 \text{ years old}) = 62,689/103,870
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P(Divorced or 18-29) = 32,949/103,870 But how?

P(Never married or 65 and over) = 39,783/103,870

	Age				
	18–29	30-64	65 and over	Total	
Married	7,842	43,808	8,270	59,920	
Never married	13,930	7,184	751	21,865	
Widowed	36	2,523	8,385	10,944	
Divorced	704	9,174	1,263	11,141	
Total	22,512	62,689	18,669	103,870	

Suppose you are choosing at random from only the married women

P(Age 30-64) = 43, 808/59,920 =

	Age			
	18-29	30-64	65 and over	Total
Married	7,842	43,808	8,270	59,920
Never married	13,930	7,184	751	21,865
Widowed	36	2,523	8,385	10,944
Divorced	704	9,174	1,263	11,141
Total	22,512	62,689	18,669	103,870



## A little bit of probability notation:

**P(G)** = Probability that Gianna will be late for class

 $P(G^{c}) = P(not G) = Probability that Gianna is not late for class$ 

## The subscript C stands for the complement of P(G) which means the opposite of G occurs

**P(S)** = Probability that Sydney will be late for class

**P**(**S**<sup>c</sup>) = **P**(**not S**) = Probability that Sydney is not late for class



 $P(S \& G^{C}) = P(S \& not G) = 0.18$   $P(N) = P(G^{C} \& S^{C}) = 0.3$ 

**P(G) = 0.4 P(S) = 0.3 P(G & S) = 0.12 P(G & S<sup>c</sup>) = P(G & not S) = 0.28** 



**G & S** = They

class

0.52

are both late for

0.07

**P(G)** = 0.35

0.13

Sydney but not

Gianna is late

S not G =

for class

Sample

Space

**P(G not S)** = 0.28 **P(G & S)** = 0.07

for class

**N** = Neither are

late for class

0.28