Conditional Probability and Double Entry Tables

A common way to answer conditional probability questions is by using a double entry table.

	Advanced Math	Regular Math	Total
Boys	30	50	80
Girls	40	80	120
Total	70	130	200

We can calculate the probability of selecting certain students at random.

Example 1: What is the probability of selecting a girl in Advanced Math from all of the students?

$$P_{\text{Advanced Math Girl}} = \frac{\#\text{ of Advanced Math Girls}}{\text{Total \# of Students}}$$
$$= \frac{40}{200} = \frac{1}{5}$$

Example 2: Calculate the probability of selecting a student in Advanced Math, given that the student selected is a girl. (LOOK ONLY AT WHAT IS GIVEN)

	Advanced Math	Regular Math	Total
Girls	40	80	120

$$P_{\text{Advanced Math Girl}} = \frac{\#\text{ of Advanced Math Girls}}{\text{Total \# of Girls}}$$
$$= \frac{40}{120}$$
$$= \frac{1}{3}$$

Example 3: Make a double entry table for the following situation. A middle – school in Chicago has 400 students; 240 of the students are girls. Seventy percent of the students are in Grade 7, the rest are in Grade 8. The probability of selecting a Grade 7 boy at random is ¼.

	Grade 7	Grade 8	Total
Boys			
Girls			
Total			

400 students

240 students are girls

- 70% in Grade 7: $\left(\frac{70}{100}\right)\left(\frac{400}{1}\right) = 280$
- $P_{\text{Grade 7 Boy}} = \frac{1}{4} : \left(\frac{1}{4}\right)\left(\frac{400}{1}\right) = 100$

Total Grade 8 = 400 – 280 = 120

Total Boys = 400 – 240 = 160

Grade 8 Boys = 160 – 100 = 60

Grade 7 Girls = 280 – 100 = 180

Grade 8 Girls = 120 – 60 = 60

	Grade 7	Grade 8	Total
Boys	100	60	160
Girls	180	60	240
Total	280	120	400