

## TOPIC: CONTINGENCY TABLES

### Contingency Tables and Expected Frequencies

◆ A **Contingency Table** shows frequencies of categories from \_\_\_\_ variables.

► If variables are assumed to be \_\_\_\_\_, find  $E$  by multiplying prob's of indepdent events.

#### EXAMPLE

The table shows heights of 161 students in 9th & 10th grade at a high school. Use the table to answer the questions, then find the expected frequency of each cell. Assume height & grade are independent.

New
Expected Frequency from Contingency Tables

|       |      | Height                         |                                |                                | Tot. |
|-------|------|--------------------------------|--------------------------------|--------------------------------|------|
|       |      | 5'1"-5'6"                      | 5'7"-6'0"                      | 6'1"-6'6"                      |      |
| Grade | 9th  | $O = 40$<br>$E = \text{---} =$ | $O = 27$<br>$E = \text{---} =$ | $O = 10$<br>$E = \text{---} =$ | 77   |
|       | 10th | $O = 32$<br>$E = \text{---} =$ | $O = 34$<br>$E = \text{---} =$ | $O = 17$<br>$E = \text{---} =$ | 83   |
|       | Tot. | 72                             | 61                             | 27                             | 161  |

$O$  = "observed" frequency;  $E$  = "expected" frequency

(A) How many 9th graders are between 5'1"-5'6"?

(B) How many *students* are between 6'1"-6'6"?

Recall

$$P(A \cap B) = P(A) \cdot P(B)$$

(Prob. of Independent Events)

$$P = \text{---} \cdot \text{---}$$

Recall

$$E = np = \text{Total} \cdot P$$

$$E =$$

$$E = \frac{\text{total} \cdot \text{total}}{\text{Grand Total}}$$

#### PRACTICE

The table below shows the results from a drug trial for a new ADHD medication. Find the frequencies that we would expect if improvement of symptoms was independent of whether a participant received the placebo.

|          |              | Group   |             |       |
|----------|--------------|---------|-------------|-------|
|          |              | Placebo | Non-Placebo | Total |
| Symptoms | Improved     | 18      | 37          | 55    |
|          | Not Improved | 30      | 15          | 45    |
|          | Total        | 48      | 52          | 100   |

Recall

$$E = \frac{\text{row total} \cdot \text{col total}}{\text{Grand Total}}$$