MORE ABOUT TESTS AND INTERVALS

CRITICAL VALUES

- The $\alpha$ level you choose corresponds to a critical $z$-value (the $z^*$).
- The traditional critical values from the normal model are:

<table>
<thead>
<tr>
<th>$\alpha$</th>
<th>1-sided</th>
<th>2-sided</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>1.645</td>
<td>1.96</td>
</tr>
<tr>
<td>0.01</td>
<td>2.28</td>
<td>2.575</td>
</tr>
<tr>
<td>0.001</td>
<td>3.09</td>
<td>3.29</td>
</tr>
</tbody>
</table>
MAKING ERRORS

✓ When we perform a hypothesis test, we can make mistakes in two ways:
  I. The null hypothesis is true, but we mistakenly reject it. (Type I error)
     The probability of a Type I error is $\alpha$
   II. The null hypothesis is false, but we fail to reject it. (Type II error)
      The probability of a Type II error is $\beta$

MAKING ERRORS (CONT.)

✓ Which type of error is more serious depends on the situation at hand. In other words, the gravity of the error is context dependent.
✓ Here’s an illustration of the four situations in a hypothesis test:

MAKING ERRORS (CONT.)

✓ How often will a Type I error occur?
  - Since a Type I error is rejecting a true null hypothesis, the probability of a Type I error is our $\alpha$ level.
✓ When $H_0$ is false and we reject it, we have done the right thing.
  - A test’s ability to detect a false hypothesis is called the power of the test.
  - Power is given by $1 - \beta$