

Power of a Test

- The power of a test = $1 - P(\text{Type II Error})$.
(i.e. can be thought of as how good the test was as doing the right thing)

Example

$$H_0: \lambda = 8$$

at the 10% level

$$H_1: \lambda \neq 8$$

$$\therefore \text{critical values} \Rightarrow X \leq 3, X \geq 14$$

Always need to find critical regions

$$\begin{aligned} P(\text{Type II Error}) &= P(\text{Accepting } H_0 \mid H_0 \text{ is false}) \\ &= P(4 \leq X \leq 13 \mid \lambda = 7) \quad \leftarrow \text{actual mean} \\ &= P(X \leq 13 \mid \lambda = 7) - P(X \leq 3 \mid \lambda = 7) \\ &= 0.4084231914 \end{aligned}$$

$$\therefore \text{power} = 1 - \text{"} = 0.0945770086$$