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**p-values**

1. Suppose  $X \sim \text{Unif}[0, \theta]$ . We'd like to test the following hypotheses:

$$H_0 : \theta \leq 1 \quad \text{vs.} \quad H_1 : \theta > 1$$

Let  $\delta_c$  be the procedure that rejects  $H_0$  if  $X \geq c$  for some  $c > 0$ . It might useful to

recall that if  $X \sim \text{Unif}[a, b]$ , then  $F_X(x) = \begin{cases} 0 & x < a \\ \frac{x-a}{b-a} & a \leq x \leq b \\ 1 & x > b \end{cases}$

- (a) For each possible value of  $X = x$ , find the form of the p-value if  $x$  is observed.
- (b) Briefly interpret your p-value from (a), and discuss why the p-value “makes sense”.