Homework #5

Schedule for rest of the semester:

• Monday 11/21: Lecture (Section 8.1)
• Monday 11/28: Lecture
• Wednesday 11/30: Lecture
• Friday 12/2: Review for Midterm #3
• Monday 12/5: Midterm #3 (covers Section 6.3 through 11/30 lecture: compactness, connectedness, and continuity)
• Wednesday 12/7: Discussion of Midterm #3, last day of class
• Monday 12/12: Optional Final Exam, 3:00–5:00pm

1. Show that if $S$ is a connected subset of the metric space $(X, d)$ then its closure $\overline{S}$ is also connected.

2. Let $(X, d_X)$ be any metric space and $(Y, d_Y)$ be any metric space with the discrete metric. Determine, with proof,
   (a) all continuous functions $f : Y \to X$ and
   (b) all continuous functions $f : \mathbb{R} \to Y$. 