More of the Limit: In-Class Evidence

Working in your group or independently, complete part of the practice problems here as primary evidence to use for this unit.

1. Explain why the following "function" would be impossible.
$$\lim_{x \to c^-} f(x) = -1 \quad \text{AND} \quad \lim_{x \to c^+} f(x) = +1$$
    For EVERY $c \in [0,1]$

2. Imagine the following scenario.
    Turn on a light. Wait 30 seconds.
    Turn off the light. Wait 15 seconds.
    Turn on the light. Wait 7.5 seconds.
    Turn off the light. Wait 3.75 seconds.
    Continue turning the light on and off as the intervals between each turn is halved. After 1 minute what will the state of the light switch be?

3. Make a function that is continuous on the interval $(0,1)$ but discontinuous on the interval $[0,1]$.

4. When you looked at exponentials, you wanted the base to be positive. When is $f(x) = (-1)^x$ continuous?