MAT 136 (Calculus I), Prof. Jim Swift
Worksheet 8: True/False questions about Limits and Continuity

Recall that "if P, then Q", also written as "P implies Q" or "$P \implies Q$" means that whenever P is true, Q is also true. Another way to say this: "if P is true, then Q is true."

For example, "if an animal is a dog, then it is a mammal" is a true statement.

Note that the converse, "if an animal is a mammal, then it is a dog," is a false statement.

My cat Chloe is a counter-example for that false statement. "Chloe is a mammal" is true, but "Chloe is a dog" is false.

The existence of Rover the dog does not prove either statement. You cannot prove $P \implies Q$ with an example like Rover, but you can disprove it with a counter-example like Chloe.

Discuss each of these statements with some classmates. If you can write on your copy of the pdf, circle your answer. Otherwise, make a list of your answers. I will announce the answers near the end of class, with some time for discussion. You do *not* need to turn this in.

1. T / F : If $f(a)$ is undefined, then $\lim_{x \to a} f(x)$ DNE.
2. T / F : If $\lim_{x \to a} f(x)$ DNE, then $f(a)$ is undefined.
3. T / F : If f is continuous at a, then $f(a)$ is defined.
4. T / F : If $f(a)$ is defined, then f is continuous at a.
5. T / F : If $\lim_{x \to a} f(x) = L$, then $f(a) = L$. (L is a real number, so $L = \infty$ is not allowed.)
6. T / F : If f is continuous at a and $\lim_{x \to a} f(x) = L$, then $f(a) = L$. (L is a real number.)
7. T / F : If $\lim_{x \to a} f(x)$ DNE, then $\lim_{x \to a^+} f(x)$ DNE.
8. T / F : If $\lim_{x \to a^-} f(x)$ DNE, then $\lim_{x \to a} f(x)$ DNE.