Big-O Notation Practice
This is an ungraded class activity and you may not have time to answer all of the questions. You have until approximately 2:35-2:40 to work on this.

Review of limits - evaluate the following:

$\lim_{n\to\infty} \frac{n^{10}-1000n^4+12}{3n^{10}-n^9}$

$\lim_{n\to\infty} \frac{1}{e^n}$

$\lim_{n\to\infty} \frac{n!}{n^n}$

$\lim_{n\to\infty} \frac{n^4+n^3-36}{n+8}$

Instructions: Answer the remainder of the questions on this worksheet **twice** - once using the limit definition of big-O notation, and once using the inequality definition.

An algorithm takes $f(n) = n^7 + 12$ operations to execute. How should you describe this run-time using big-O notation? Prove that your answer is correct using each definition.

Prove that the function from the last question is $O(8n^{11})$. Even though this fits the definition of big-O, what is wrong with using $8n^{11}$ to describe the run-time of your algorithm?

Prove that the function f is not $O(n + \sqrt{n})$.