Squences (Summary)

Suppose a_n is your sequence. A sequence either converges (the number it eventually settles towards being called the limit), or otherwise, we say the sequence diverges. If it diverges (does not converge), it may possibly "diverge in a special way": oscillation, diverging to infinity, or diverging to negative infinity.

Sandwiching. If $b_n \leq a_n \leq c_n$ and b_n and c_n BOTH converge to the SAME limit, then a_n converges, and to the same limit as well. You can NOT use sandwiching to conclude that a sequence diverges.

L'Hopital's Rule. If $a_n = f(n)$ for all $n \geq N$ for some continuous function f and as n increases, you have the form $\frac{0}{0}$ or $\frac{\infty}{\infty}$, then you can calculate the limit of a_n by taking the derivative on top and bottom: now see if the new limit you need to calculate is easier.

Continuous function output. If $a_n = f(b_n)$ for some sequence b_n and $b_n \to B$ and f is continuous, then $a_n \to f(B)$. This test can only be used to conclude that a_n converges.