Critical Thinking Questions

Figure 1: The Squeeze Theorem

1. This is the symbol for the set of all real numbers: $\mathbb{R}$.
2. This is the symbol for the set of integers: $\mathbb{Z}$.
3. This is the symbol for the set of rational numbers: $\mathbb{Q}$.
4. Is it possible for a sequence to converge to two differnet numbers? If so, give an example, if not, explain why not.
5. Explain why $\int_1^\infty f(x)\,dx$ and $\sum_{n=1}^{\infty} a_n$ need not converge to the same value, even if they are both convergent.
6. In your own words, explain the Alternating Series Remainder Theorem. How is this theorem useful?
7. Explain the difference between absolute and conditional convergence. Give and example of each.
8. The ratio test is inconclusive if $\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| = 1$. Give an example of one convergent series and one divergent series for which $\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| = 1$. Explain how you determined your examples.

1. $\lim_{n\to\infty}$
2. $\sum_{n=1}^{\infty}$
3. $\int_6^{10}$

$$x^2 + 2x + c \tag{1}$$