- **Quiz 1**(1):
  f is continuous at x_0 means that: $\forall \varepsilon > 0$, $\exists \delta > 0$, such that $\forall |x - x_0| \leq \delta$,i.e.,$x \in \mathbb{U}(x_0, \delta)$, we have $|f(x) - f(x_0)| \leq \varepsilon$.

  While $\{x_n\}$ converging to x_0 means that: $\forall \varepsilon_1 > 0, \exists N > 0$ such that $\forall n \geq N, |x_n - x_0| \leq \varepsilon_1$.

  Let $\varepsilon_1 = \delta$, then for the ε and δ there is a positive integer N_δ such that $\forall n \geq N_\delta, |x_n - x_0| < \delta$, with the continuous of f at x_0 we get $|f(x_n) - fx_0| < \varepsilon$. That is to say $\lim\limits_{n\to\infty} f(x_n) = f(x_0)$.

  In short: $\lim\limits_{n\to\infty} f(x_n) = f\left(\lim\limits_{n\to\infty} x_n\right) = f(x_0)$.

- **Quiz 1**(2):Textbook page 114, example 4.

- **Quiz 2**:
  suppose we apply the Composite Simpson's rule with n subintervals to a function f on $[a, b]$ and determine the maximum bound for the round-off error. Assume that $f(x_i)$ is approximated by $\tilde{f}(x_i)$ and that

  $$f(x_i) = \tilde{f}(x_i) + e_i, \quad \text{for each } i = 0, 1, \ldots, n,$$

  where e_i denotes the round-off error associated with using $\tilde{f}(x_i)$ to approximate $f(x_i)$. Then the accumulated error, $e(h)$, in the Composite Simpson's rule is

  $$\begin{aligned} e(h) &= \left| \frac{h}{3}[e_0 + 2\sum_{j=1}^{(n/2)-1} e_{2j} + 4\sum_{j=1}^{n/2} e_{2j-1} + e_n] \right| \\ &\leq \frac{h}{3}\left[|e_0| + 2\sum_{j=1}^{(n/2)-1} |e_{2j}| + 4\sum_{j=1}^{n/2} |e_{2j-1}| + |e_n| \right]. \end{aligned}$$

  If the round-off errors are uniformly bounded by ϵ, then

  $$e(h) \leq \frac{h}{3}\left[\epsilon + 2\sum_{j=1}^{(n/2)-1} \epsilon + 4\sum_{j=1}^{n/2} \epsilon + \epsilon \right] = \frac{h}{3} 3n\epsilon = nh\epsilon.$$

  Here $nh = b - a$, so

  $$e(h) \leq (b - a)\epsilon,$$

  a bound independent of h and n. This means that, even though we may need to divide an interval into more parts to ensure accuracy, the increased computation that is required does not increase the round-off error.

- **Quiz 3**:Textbook page 271,Theorem 5.9.