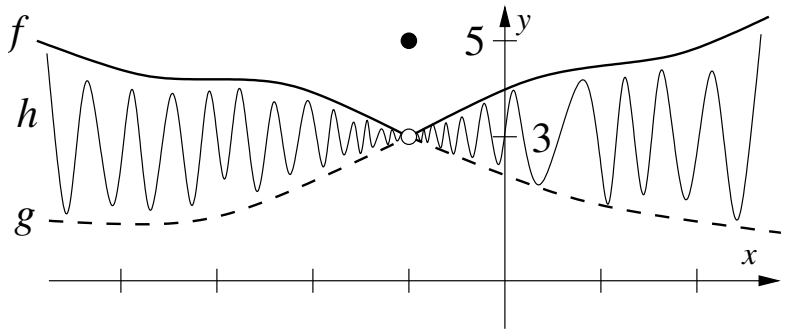
Class prep quiz on sections 2.3 and 2.5, Stewart's Calculus (8th ed.)

1. Let $g(x) = 3x^2 - 5$. What is the value of $\lim_{h \to 0} \dfrac{g(7+h) - g(7)}{h}$?

   (a) 1
   (b) 0
   (c) The limit does not exist
   (d) 42

2. Suppose the graphs of $f(x)$ (heavy solid lines), $g(x)$ (heavy dashed lines), and $h(x)$ (thin solid lines) are as follows:



   Suppose also that $\lim_{x \to -1} f(x) = 3 = \lim_{x \to -1} g(x)$, and that $f(-1) = g(-1) = h(-1) = 5$, as shown by the solid dot. What conclusion(s) can you draw about $\lim_{x \to -1} h(x)$?

   (a) No conclusion can be drawn about $\lim_{x \to -1} h(x)$
   (b) $\lim_{x \to -1} h(x) = 3$
   (c) $\lim_{x \to -1} h(x) = 5$
   (d) $\lim_{x \to -1} h(x)$ does not exist

3. Suppose $f(x)$ is continuous at $x = a$. Which of the following statements **must** be true?

   (a) $\lim_{x \to a} f(x)$ exists.
   (b) The value $f(a)$ must exist.
   (c) $\lim_{x \to a} f(x)$ must be equal to $f(a)$.
   (d) All of the above.

4. Consider the function

$$f(x) = \begin{cases} 5x - 2 & \text{for } x \leq 2, \\ 3x + 2 & \text{for } 2 < x < 5, \\ x^2 - 10 & \text{for } x \geq 5. \end{cases}$$

At which values of x is $f(x)$ **not** continuous?

(a) $f(x)$ is continuous at every real value of x.
(b) $f(x)$ is discontinuous at $x = 2$ and $x = 5$ only.
(c) $f(x)$ is discontinuous at $x = 2$ only.
(d) $f(x)$ is discontinuous at $x = 5$ only.