

Solutions to Quiz #3

Again, there may be more than one way to solve these problems.

1. True. See “Caution” box on p. 139.
2. False. We have two outputs for -1 .
3. False. See “Caution” box on p. 139.
4. True. It is okay for a function to give the same output for two different inputs.
5. False. See “Caution” box on p. 139.
6. The function is undefined (in other words, its rule doesn’t make sense) when $x - 1 < 0$. So the function needs $x - 1 \geq 0$, in other words $x \geq 1$, to be defined. Note I used “ \geq ”, **not** “ $>$ ”, since $\sqrt{0}$ is defined. Furthermore, the function needs $x \neq -1$, but that doesn’t actually make any difference, since we need $x \geq 1$ anyway. So, in **interval notation** (which I asked for), the domain is $[1, \infty)$.
7. Be sure to understand what $g(x + h)$ means. (See “Caution” box on p. 136. We have

$$\begin{aligned}\frac{g(x + h) - g(x)}{h} &= \frac{(x + h)^2 + 3 - (x^2 + 3)}{h} \\ &= \frac{x^2 + 2xh + h^2 + 3 - x^2 - 3}{h} \\ &= \frac{2xh + h^2}{h} = 2x + h.\end{aligned}$$

8. The identity function is $f(x) = x$. Catalog of basic functions—as my high school chemistry teacher used to say: learn it, live it, love it!