

Quiz 1 Solutions

1. (2 points) Find the domain of the function $f(x) = \frac{1}{\sqrt{x}}$.

Solution. From the function we can read

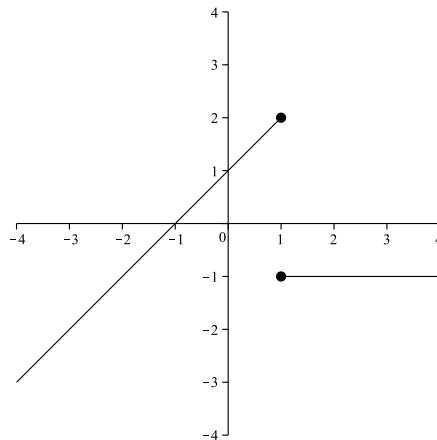
$$\begin{cases} \sqrt{x} \neq 0; \\ x \geq 0. \end{cases}$$

Solving the inequalities, we get $x > 0$, or in interval notation, $(0, \infty)$.

2. (2 points) Write the function $H(x) = (1 - x)^2$ as the composition of two simpler functions.

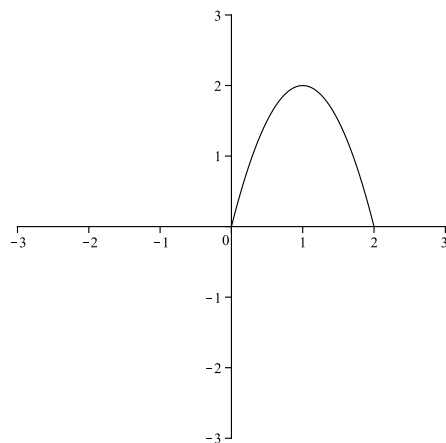
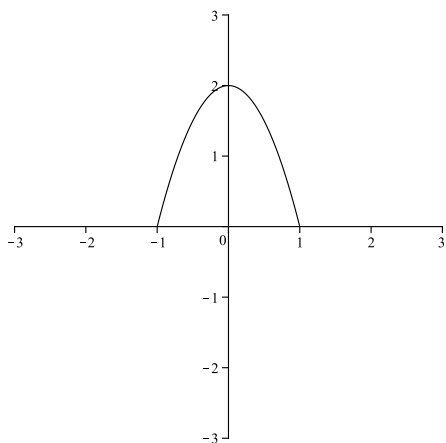
Solution. Let $f(x) = 1 - x$ and $g(x) = x^2$, then $H(x) = (g \circ f)(x)$.

3. (2 points) Determine whether the following graph represents a function. Explain your reason briefly.

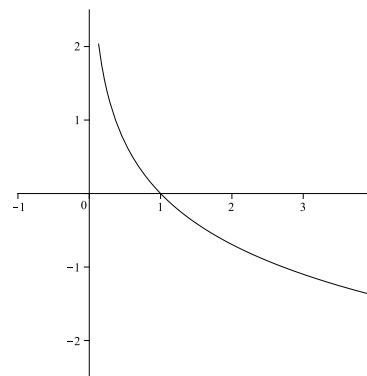
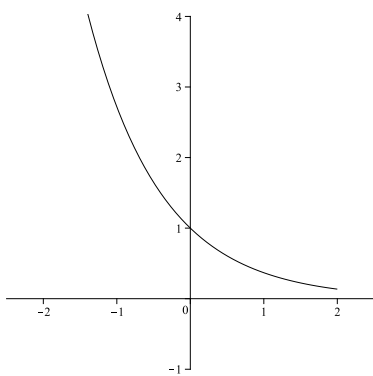
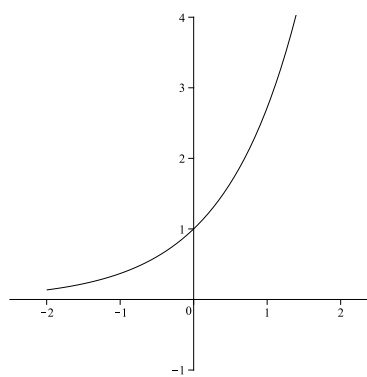
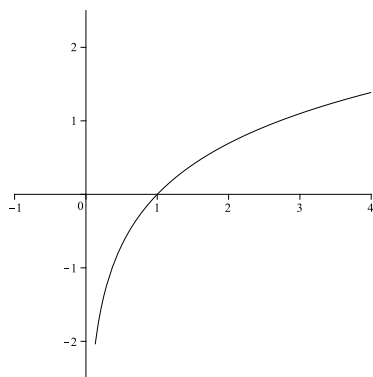


Solution. The vertical line $x = 1$ hits the graph at two points $(1, 2)$ and $(1, -1)$. By vertical line test, this graph doesn't represent a function.

4. (2 points) On the left is the graph of a function $f(x)$. Sketch the graph of the function $f(x - 1)$ in the coordinate system on the right.



5. (2 points) Let $f(x) = \ln x$. Which of the following is the graph of $f^{-1}(x)$? Explain your reason briefly.



Solution. The upper right graph is the correct one. The upper left is the graph of $f(x) = \ln x$. To find the graph of its inverse, we only need to reflect it about the line $y = x$. In fact, the inverse function is $f^{-1}(x) = e^x$, whose graph agrees with our choice.