Understanding inverse relations
Student Activity Sheet 4; *Exploring* "The quadratic function and its inverse"

12. Suppose the inverse of $y = x^2$ is determined by reflecting the graph of $y = x^2$ across the line $y = x$. Is this inverse relation an inverse function? Explain. **[EX3, page 7]**

   The inverse relation of $y = x^2$ is not a function because the domain values map to two different range values. (It does not pass the vertical line test.)

13. For the inverse of a function to be a function, what must be true about the original function? **[EX3, page 8]**

   each y value comes from only 1 x value

   The original function must be a one-to-one function. Each range value, y, must be associated with exactly one domain value, x.

   ✱ The original function must pass the Horiz. Line Test

   After the graph of a 1-to-1 function passes the Horiz Line Test

14. Is the inverse of the absolute value parent function $y = |x|$ a function? Justify your answer. **[EX3, page 9]**

   No, the inverse is not a function because the original function, $y = |x|$, is not a one-to-one function. For example, $y = 2$ when $x = 2$ or when $x = -2$.

15. What must you do to a quadratic function so that the function is a one-to-one function? **[EX3, page 10]**

   You must restrict the domain such that $x \geq 0$. When $f(x) = x^2$ and $x \geq 0$, the inverse function is $g^{-1}(x) = \sqrt{x}$.