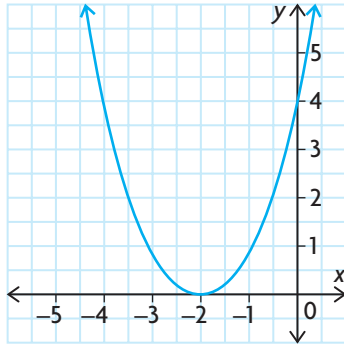
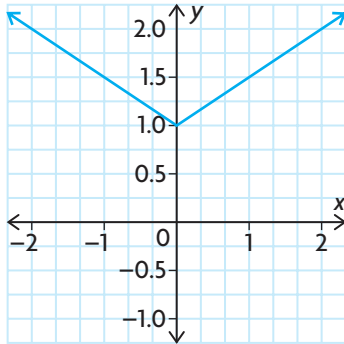


1

Chapter Self-Test



- Consider the graph of the relation shown.
 - Is the relation a function? Explain.
 - State the domain and range.
- Given the following information about a function:
 - $D = \{x \in \mathbf{R}\}$
 - $R = \{y \in \mathbf{R} \mid y \geq -2\}$
 - decreasing on the interval $(-\infty, 0)$
 - increasing on the interval $(0, \infty)$
 - What is a possible parent function?
 - Draw a possible graph of the function.
 - Describe the transformation that was performed.
- Show algebraically that the function $f(x) = |3x| + x^2$ is an even function.
- Both $f(x) = x^2$ and $g(x) = 2^x$ have a domain of all real numbers. List as many characteristics as you can to distinguish the two functions.
- Describe the transformations that must be applied to $y = x^2$ to obtain the function $f(x) = -(x + 3)^2 - 5$, then graph the function.
- Given the graph shown, describe the transformations that were performed to get this function. Write the algebraic representation, using function notation.
 
- $(3, 5)$ is a point on the graph of $y = f(x)$. Find the corresponding point on the graph of each of the following relations.
 - $y = 3f(-x + 1) + 2$
 - $y = f^{-1}(x)$
- Find the inverse of $f(x) = -2(x + 1)$.
- A certain tax policy states that the first \$50 000 of income is taxed at 5% and any income above \$50 000 is taxed at 12%.
 - Calculate the tax on \$125 000.
 - Write a function that models the tax policy.
- Sketch the graph of $f(x)$ where $f(x) = \begin{cases} 2^x + 1, & \text{if } x < 0 \\ \sqrt{x} + 3, & \text{if } x \geq 0 \end{cases}$
 - Is $f(x)$ continuous over its entire domain? Explain.
 - State the intervals of increase and decrease.
 - State the domain and range of this function.