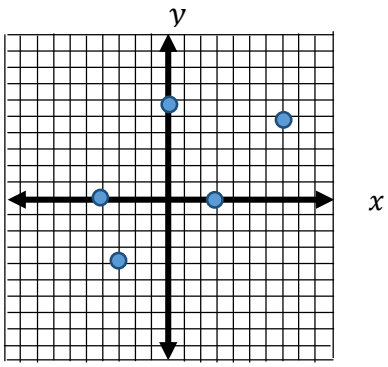
6.5 Practice Set

1. What does it mean to be one-to-one?
2. What is the horizontal line test?
3. If a relation passes the horizontal line test but not the vertical line test, is it one-to-one? Explain.
4. Describe the symmetry of a function and its inverse.

Determine whether or not each of the following represents a one-to-one function. Why or why not?

5.



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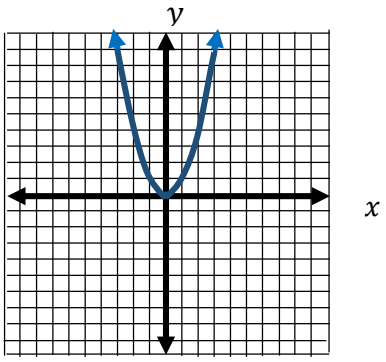

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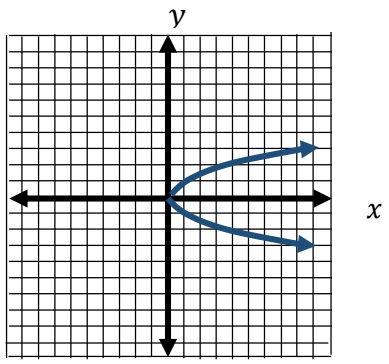

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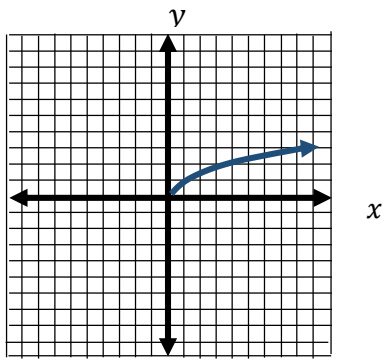

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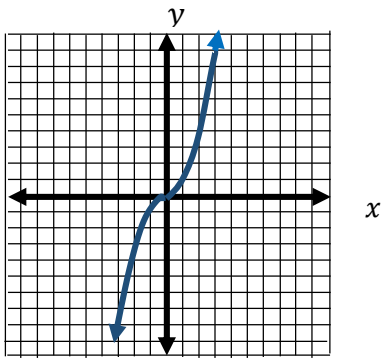

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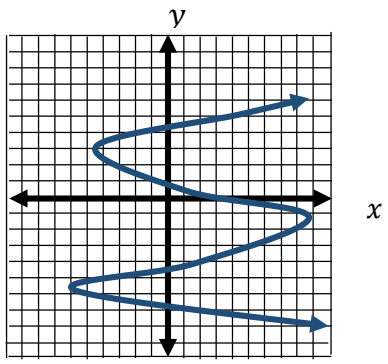

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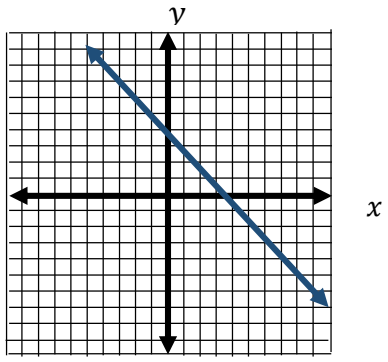

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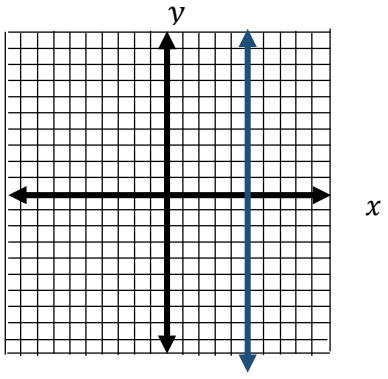

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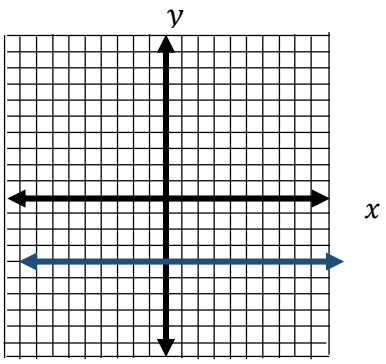

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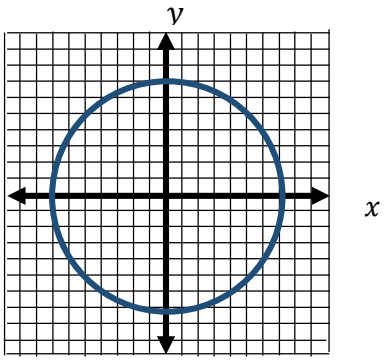

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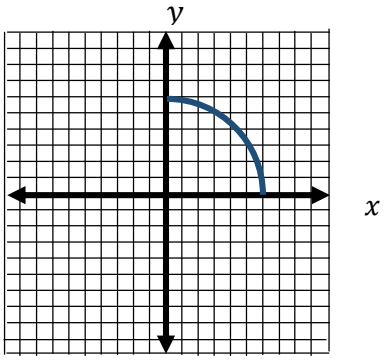

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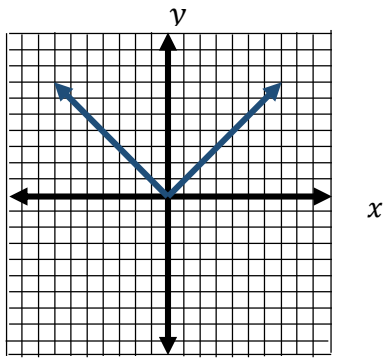

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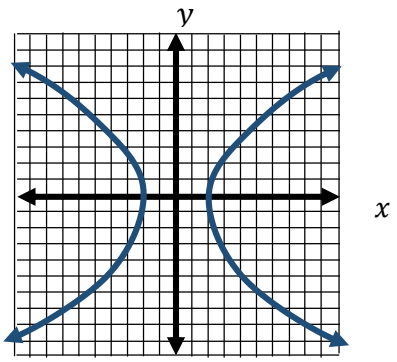

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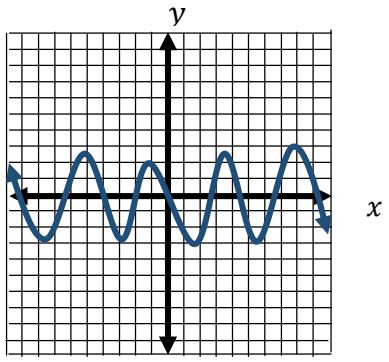

Find the inverse of each of the following one-to-one functions and graph both functions on the same set of axes. State any domain restrictions that exist for the inverse function.

19. $f(x) = -2x + 4$

20. $y = x^3 - 5$

21. $y = \frac{x-18}{3}$

22. $g(x) = \sqrt{x-5}$

23. $y = (x-2)^2 + 3; \quad x \leq 2$

Show that each pair of functions are inverses of each other.

24. $\begin{cases} f(x) = (x-3)^5 \\ g(x) = \sqrt[5]{x} + 3 \end{cases}$

25. $\begin{cases} h(x) = \frac{3x-2}{4x+1} \\ k(x) = \frac{x-2}{4x-3} \end{cases}$

Distributed Practice Problems

For each of the following pairs of functions, perform the following operations and give any restrictions on the domain of the resulting function:

$$(\boldsymbol{f+g})(\boldsymbol{x}), (\boldsymbol{f-g})(\boldsymbol{x}), (\boldsymbol{f \cdot g})(\boldsymbol{x}), \textbf{and } (\tfrac{\boldsymbol{f}}{\boldsymbol{g}})(\boldsymbol{x}).$$

26. $\begin{cases} f(x) = 4x - 2 \\ g(x) = 5x + 9 \end{cases}$

27. $\begin{cases} f(x) = x^2 - 3x + 1 \\ g(x) = -5x + 2 \end{cases}$

For each of the following pairs of functions, find the compositions $(\boldsymbol{f} \circ \boldsymbol{g})(\boldsymbol{x})$ **and** $(\boldsymbol{g} \circ \boldsymbol{f})(\boldsymbol{x})$ and give any restrictions on the domain of the resulting function.

28. $\begin{cases} f(x) = -2x^2 + 7x + 4 \\ g(x) = 3x - 1 \end{cases}$

29. $\begin{cases} f(x) = \sqrt{x - 1} \\ g(x) = 4x^2 + 5 \end{cases}$

Graph the following function. Give the x-intercept(s), y-intercept, domain, range, and the equation(s) of any asymptote(s).

30. $y = \log_4(x + 1) - 2$