1.1.25. If $f(x) = 3x^2 - x + 2$, find $f(2)$, $f(-2)$, $f(a)$, $f(-a)$, $f(a+1)$, $2f(a)$, $f(2a)$, $f(a^2)$, $[f(a)]^2$, and $f(a+h)$.

1.1.27. Evaluate the difference quotient $\frac{f(3+h)-f(3)}{h}$ for the function $f(x) = 4 + 3x - x^2$. Simplify your answer.

1.1.29. Evaluate the difference quotient $\frac{f(x)-f(a)}{x-a}$ for the function $f(x) = \frac{1}{x}$. Simplify your answer.

1.1.31. Find the domain of $f(x) = \frac{x+4}{x^2-9}$.

1.1.33. Find the domain of $f(t) = \sqrt[3]{2t-1}$.

1.1.35. Find the domain of $h(x) = \frac{1}{\sqrt[4]{x^2-5x}}$.

1.1.37. Find the domain of $F(p) = \sqrt{2-\sqrt{p}}$.

1.1.47. Find the domain and sketch the graph of $f(x) = \begin{cases} x+2 \text{ if } x < 0 \\ 1-x \text{ if } x \geq 0 \end{cases}$.

1.1.49. Find the domain and sketch the graph of $f(x) = \begin{cases} x+2 \text{ if } x \leq -1 \\ x^2 \text{ if } x > -1 \end{cases}$.

1.1.51. Find an expression for the function whose graph is the line segment joining ther points $(1, -3)$ and $(5, 7)$.

1.1.57. A rectangle has perimeter 20. Express the area of the rectangle as a function of the length of one of its sides.

1.1.61. An open rectangular box with volume of 2 cubic meters has a square base. Express the surface area of the box as a function of the length of a side of the base.

1.1.65. In a certain state the maximum speed permitted on freeways is 65 mph and the minimum speed is 40 mph. The fine for violating these limits is \$15 for every mile per hour above or below the limits. Express the amount of the fine as a function $F(x)$ of the driving speed.

1.2.5. Find an equation for the family of linear functions with slope 2, and sketch several members of the family. Find an equation for the family of linear funtions such that $f(2) = 1$ and sketch several members of the family. Which funciton belongs to both families?

1.2.7. What do all members of the fmaily of linear functions $f(x) = c - x$ have in common? Sketch several members of the family.

1.2.9. Find an expresisons for a cubic function f such that $f(1) = 6$ and $f(-1) = f(0) = f(2) = 0$.

1.2.13. The relationship between the Fahrenheit and Celsius temperature scales is given by the linear function $F = \frac{9}{5}C + 32$. What is the slope of this function, and what does it represent? What is the F-intercept of this function and what does it represent?

1.2.17. At the surface of the ocean, the water pressure is 15 pounds per square inch; below the surface, the water pressure increases by 4.34 pounds per square inch for every 10 feet of descent. Express the water pressure as a function of depth, and determine at which depth the pressure reaches 100 pouds per square inch.

1.3.1. For a given function f, write equations for the functions whose graphs are the following transformations of f's graph:

- shift three units upwards.
- shift three units downwards.
- shift three units to the right.
- shift three units to the left.
- reflect about the x-axis.
- reflect about the y-axis.
- stretch vertically by a factor of 3.

1.3.9. Graph the function $y = \frac{1}{x+2}$ by hand, not by plotting points, but by transforming a standard fucntion's graph.

1.3.13. Graph the function $y = \sqrt{x-2} - 1$ by hand, not by plotting points, but by transforming a standard fucntion's graph.

1.3.21. Graph the function $y = |x - 2|$ by hand, not by plotting points, but by transforming a standard fucntion's graph.

1.3.23. Graph the function $y = |\sqrt{x} - 1|$ by hand, not by plotting points, but ny transforming a standard fucntion's graph.

1.3.31. For $f(x) = x^2 - 1$ and $g(x) = 2x + 1$, find $f \circ g$, $g \circ f$, $f \circ f$, and $g \circ g$, and identify their domains.

1.3.35. For $f(x) = x + \frac{1}{x}$ and $g(x) = \frac{x+1}{x+2}$, find $f \circ g$, $g \circ f$, $f \circ f$, and $g \circ g$, and identify their domains.

1.3.41. Express $F(x) = (2x + x^2)^4$ in the form $f \circ g$.

1.3.43. Express $F(x) = \frac{\sqrt[3]{x}}{1+\sqrt[3]{x}}$ in the form $f \circ g$.

1.3.45. Express $v(t) = \sec(t^2)\tan(t^2)$ in the form $f \circ g$.

1.R.TF1. Determine whether the statement "If f is a function, then $f(s+t) = f(s) + f(t)$" is true or false. If true, explain why; if walse, explain why or give a counterexample.

1.R.TF3. Determine whether the statement "If f is a function, then $f(3x) = 3f(x)$" is true or false. If true, explain why; if walse, explain why or give a counterexample.

1.R.TF5. Determine whether the statement "A vertical line intersects the graph of a function at most once" is true or false. If true, explain why; if walse, explain why or give a counterexample.

1.R.E3. If $f(x) = x^2 - 2x + 3$, evaluate the difference quotient $\frac{f(a+h)-f(a)}{h}$.

1.R.E5. Find the domain and range of $f(x) = \frac{2}{3x-1}$.

1.R.E9. If $y = f(x)$ has a given graph, describe how the graphs of the following functions can be obtained from the graph of f:

- $y = f(x) + 8$.
- $y = f(x + 8)$.
- $y = 1 + 2f(x)$.
- $y = f(x - 2) - 2$.
- $y = -f(x)$.
- $y = f^{-1}(x)$.

1.R.E11. Use transformations to sketch the graph of $y = -\sin 2x$.

1.R.E13. Use transformations to sketch the graph of $y = \frac{1}{2}(1 + e^x)$.

1.R.E15. Use transformations to sketch the graph of $y = \frac{1}{x+2}$.