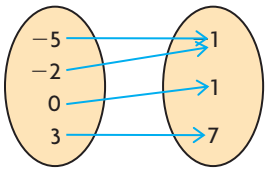
# 1 Chapter Self-Test




**1.** For each relation, determine the domain and range and whether the relation is a function. Explain your reasoning.

**a)** The function shown at the left.

**b)** $y = \sqrt{x + 2}$

**2.** An incandescent light bulb costs \$0.65 to buy and \$0.004/h for electricity to run. A fluorescent bulb costs \$3.50 to buy and \$0.001/h to run.

**a)** Use function notation to write a cost equation for each type of bulb.

**b)** State the domain and range of each function.

**c)** After how long is the fluorescent bulb cheaper than the regular bulb?

**d)** Determine the difference in costs after one year. Assume the light is on for an average of 6 h/day.

**3.** Determine the domain and range of each function. Show your steps.

**a)** $f(x) = \dfrac{1}{x - 2}$

**b)** $f(x) = \sqrt{3 - x} - 4$

**c)** $f(x) = -|x + 1| + 3$

**4.** Explain what the term *inverse* means in relation to a linear function. How are the domain and range of a linear function related to the domain and range of its inverse?

**5.** For each function, determine the inverse, sketch the graphs of the function and its inverse, and state the domain and range of both the function and its inverse.

**a)** $\{(-2, 3), (0, 5), (2, 6), (4, 8)\}$

**b)** $f(x) = 3 - 4x$

**6.** At Phoenix Fashions, Rebecca is paid a monthly salary of \$1500, plus 4% commission on her sales over \$2500.

**a)** Graph the relation between monthly earnings and sales.

**b)** Use function notation to write an equation of the relation.

**c)** Graph the inverse relation.

**d)** Use function notation to write an equation of the inverse.

**e)** Use the equation in part (d) to express Rebecca's sales if she earned \$1740 one month. Then evaluate.

**7.** The function $y = f(x)$ has been transformed to $y = f(kx)$. Determine the value of $k$ for each transformation.

**a)** a horizontal stretch by the factor 5

**b)** a horizontal compression by the factor $\frac{1}{3}$ and a reflection in the $y$-axis

**8.** The function $y = f(x)$ has been transformed to $y = af[k(x - d)] + c$. Determine $a$, $k$, $d$, and $c$; write the equation; sketch the graph; and state the domain and range of each transformed function.

**a)** vertical compression by the factor $\frac{1}{2}$, reflection in the $y$-axis, and translation 2 units right, applied to $y = \sqrt{x}$

**b)** vertical stretch by the factor 4, reflection in the $x$-axis, translation 2 units left, and translation 3 units down, applied to $y = \dfrac{1}{x}$

**c)** horizontal compression by the factor $\frac{1}{4}$, vertical stretch by the factor $\frac{3}{2}$, reflection in the $x$-axis, translation 3 units right, and translation 2 units down, applied to $y = |x|$