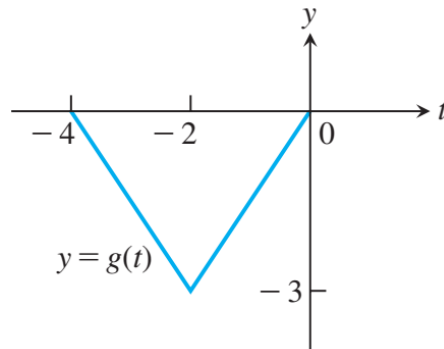# Exercise 58

The accompanying figure shows the graph of a function $g(t)$ with domain $[-4, 0]$ and range $[-3, 0]$. Find the domains and ranges of the following functions, and sketch their graphs.
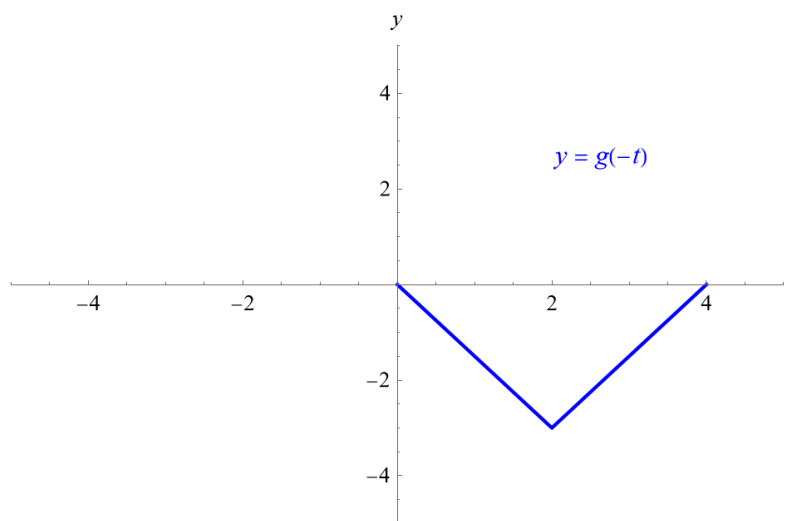

a.	$g(-t)$	**b.**	$-g(t)$
c.	$g(t) + 3$	**d.**	$1 - g(t)$
e.	$g(-t + 2)$	**f.**	$g(t - 2)$
g.	$g(1 - t)$	**h.**	$-g(t - 4)$

Solution

Part a.

$$g(-t)$$

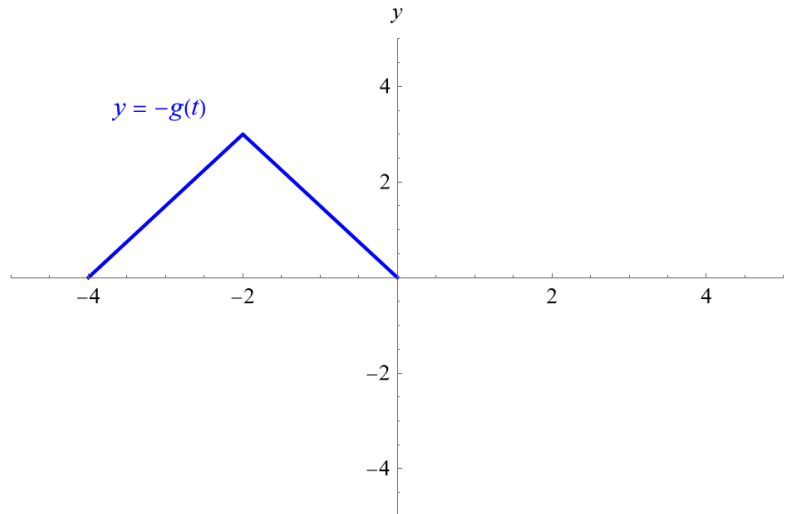Replacing t with $-t$ reflects the graph of $g(t)$ about the y-axis.

The domain of $g(-t)$ is $[0, 4]$, and the range of $g(-t)$ is $[-3, 0]$.

Part b.

$$-g(t)$$

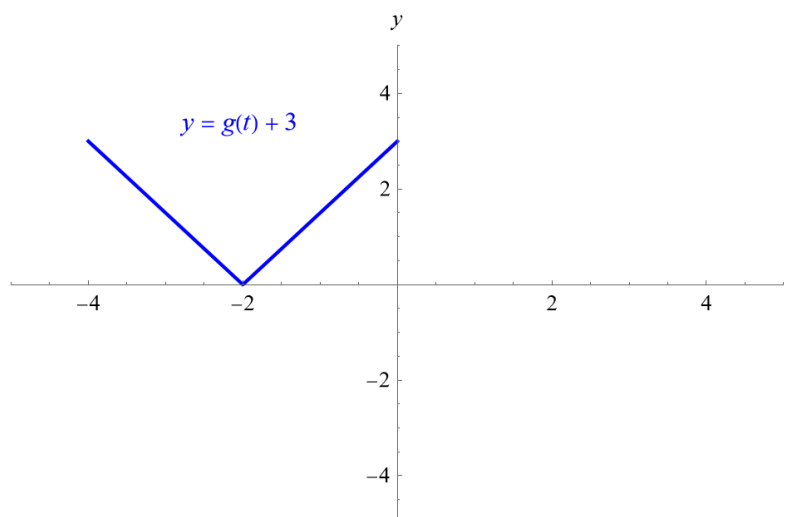Multiplying $g(t)$ by -1 reflects the graph over the t-axis.

The domain of $-g(t)$ is $[-4, 0]$, and the range of $-g(t)$ is $[0, 3]$.

Part c.

$$g(t) + 3$$
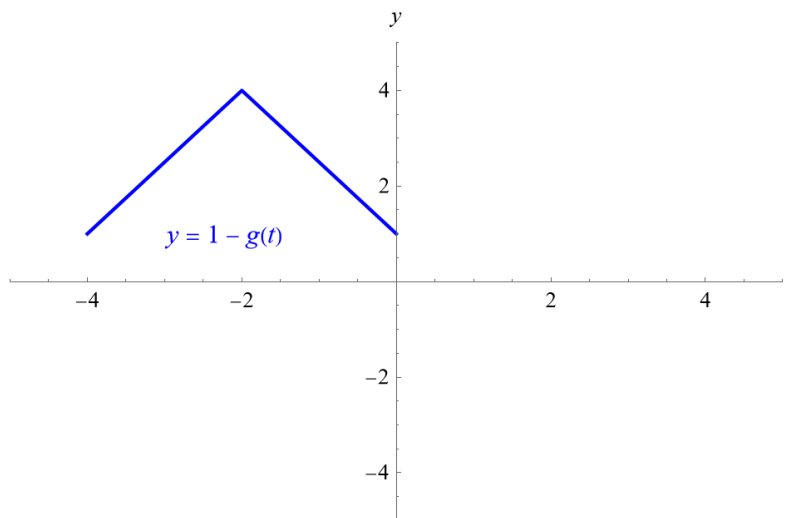
Adding 3 to $g(t)$ shifts the graph up by 3 units.

The domain of $g(t) + 3$ is $[-4, 0]$, and the range of $g(t) + 3$ is $[0, 3]$.

Part d.

$$1 - g(t)$$

Multiplying $g(t)$ by -1 reflects the graph over the t-axis, and adding 1 shifts the graph up by 1 unit.
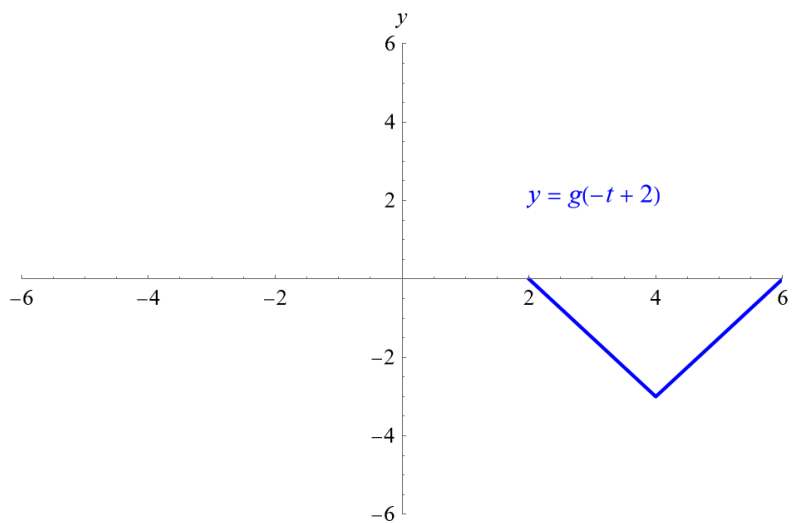

The domain of $1 - g(t)$ is $[-4, 0]$, and the range of $1 - g(t)$ is $[1, 4]$.

Part e.

$$g(-t + 2)$$

$$g(-(t - 2))$$

Replacing t with $-t$ reflects the graph of $g(t)$ about the y-axis, and replacing t with $t - 2$ shifts the graph to the right by 2 units.
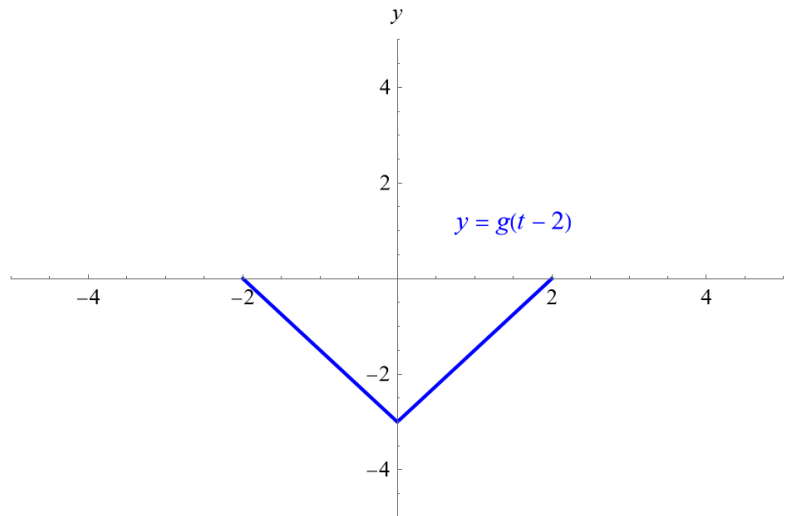

The domain of $g(-t + 2)$ is $[2, 6]$, and the range of $g(-t + 2)$ is $[-3, 0]$.

Part f.

$$g(t - 2)$$

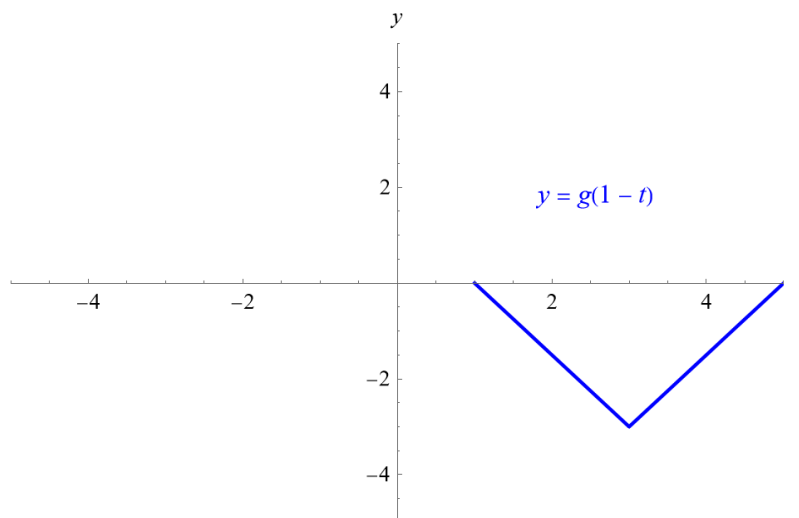Replacing t with $t - 2$ shifts the graph to the right by 2 units.

The domain of $g(t - 2)$ is $[-2, 2]$, and the range of $g(t - 2)$ is $[-3, 0]$.

Part g.

$$g(1 - t)$$

$$g(-(t - 1))$$

Replacing t with $-t$ reflects the graph of $g(t)$ about the y-axis, and replacing t with $t - 1$ shifts the graph to the right by 1 unit.
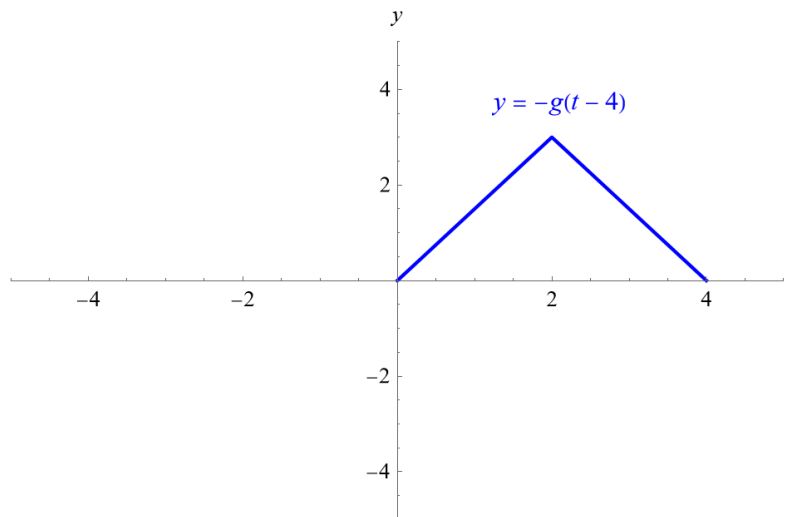
The domain of $g(1 - t)$ is $[1, 5]$, and the range of $g(1 - t)$ is $[-3, 0]$.

Part h.

$$-g(t - 4)$$

Multiplying $g(t)$ by -1 reflects the graph over the t-axis, and replacing t with $t - 4$ shifts the graph to the right by 4 units.

The domain of $-g(t - 4)$ is $[0, 4]$, and the range of $-g(t - 4)$ is $[0, 3]$.