3.4 - Techniques in Graphing

Use the following graph and preform the given operations:

- right 3.
- reflect over y-axis

- 1 down
- reflect over x-axis
Use the following graph and perform the given operations:

- Reflect over \( x \), left 3
- Left 3, reflect over \( x \)
- Up 2, reflect over \( x \)
- Reflect over \( x \), up 2

Observation: In some cases, the order of the movements
Translating and Reflecting functions.

\[ y = f(x) \]

\[ g(x) = f(x) + 1 \]

\[ g(x) = f(x + 1) \]

\[ g(x) = -f(x) \]
Translating and Reflecting functions.

\[ y = f(x) \]

\[ g(x) = f(x) - 2 \quad g(x) = f(x - 2) \quad g(x) = f(-x) \]
Summary

Given the graph of a function $y = f(x)$ and $c$ positive,

- $y = f(x) + c$
- $y = f(x) - c$
- $y = f(x - c)$
- $y = f(x + c)$
- $y = f(-x)$
- $y = -f(x)$
Example. Identify each of the graphs:
Example. Graph the following translates of $y = \sqrt{x}$:

\begin{align*}
    y &= \sqrt{x} & y &= \sqrt{x + 2} & y &= \sqrt{x + 1 + 2} \\
    y &= \sqrt{-x} & y &= \sqrt{-x + 2 - 1} & y &= -\sqrt{x} \\
    y &= -\sqrt{x - 1 - 2} & y &= -\sqrt{-x} & y &= -\sqrt{-x + 1 + 3}
\end{align*}