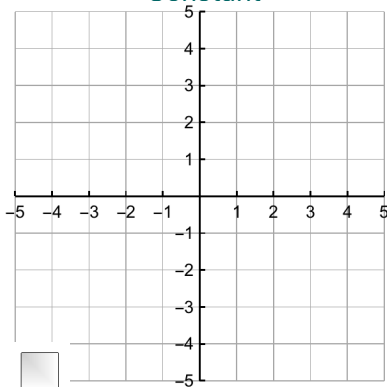


2.2 Graphs of Functions (Toolkit Functions)

Objectives: Identify and graph toolkit functions; find domain and range of the toolkit functions; graph piecewise functions.

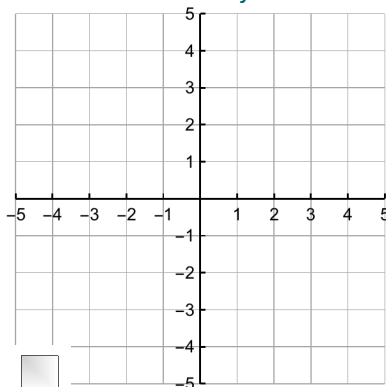
💡 Elementary tool functions are basic functions that make up the foundation of more complicated functions. Knowing the graphs of these elementary functions is very advantageous.

Constant



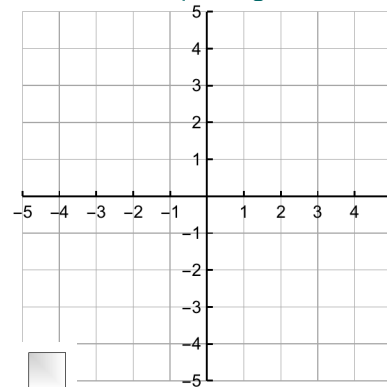
$$f(x) = 2$$

Identity



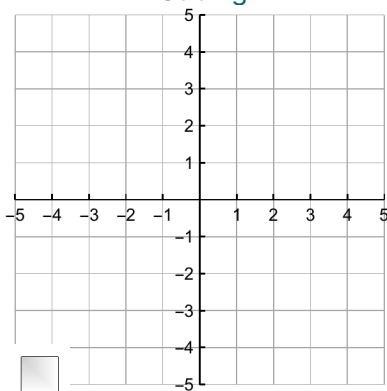
$$f(x) = x$$

Squaring



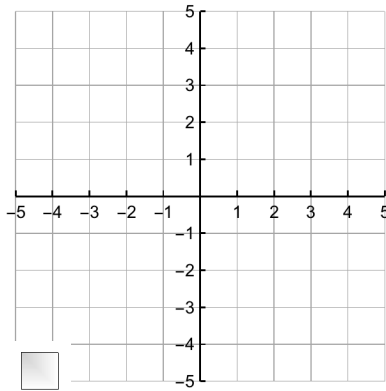
$$f(x) = x^2$$

Cubing



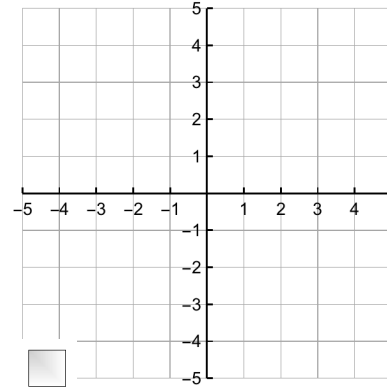
$$f(x) = x^3$$

Square Root



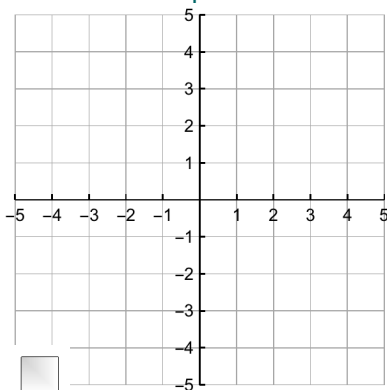
$$f(x) = \sqrt{x}$$

Cube Root



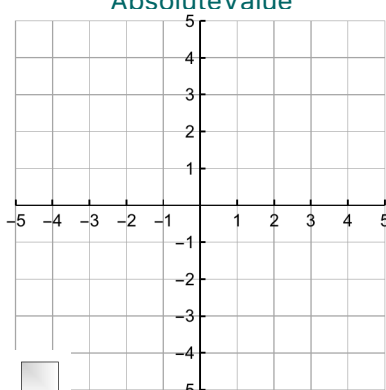
$$f(x) = \sqrt[3]{x}$$

Reciprocal



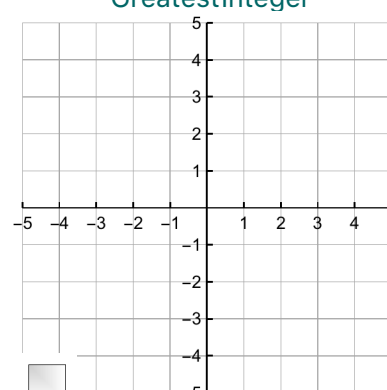
$$f(x) = \frac{1}{x}$$

Absolute Value



$$f(x) = |x|$$

Greatest Integer



$$f(x) = \llbracket x \rrbracket$$

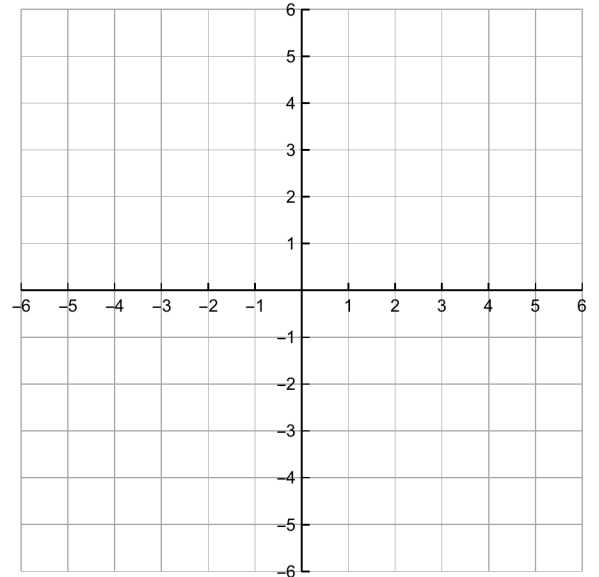
Graphing Piecewise Functions

💡 A piecewise function is a function that is defined using two or more functions on separate domains, e.g.

$$f(x) = \begin{cases} -x^2 + 4 & \text{if } -3 \leq x < 0 \\ 4 & \text{if } 0 \leq x < 3 \\ -x + 5 & \text{if } x \geq 3 \end{cases}$$

Example 1

For the function above find: (a) $f(-2)$ (b) $f(2)$ (c) $f(3)$ (d) $f(6)$ (e) graph the function.



Example 2

Graph the piecewise function: $f(x) = \begin{cases} -x & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } 0 < x \leq 4 \\ x - 3 & \text{if } x > 4 \end{cases}$

