Piece-wise Functions

**Objective:** I can sketch piece-wise functions and step functions, then state their domain and range.

**Essential Question:** What is the importance of the Domain in a piece-wise function?

**In your own words, write the meaning of each vocabulary term.**

Piece-wise function (compound function)

Step function

**Core Concepts**

**Graphing a Piece-wise Function**

The domain must be continuous. The range can be continuous but not always.

Each function will have its own interval.

**Practice**

1. \( f(x) = \begin{cases} 
  x + 4, & x < 0 \\
  -x + 4, & x \geq 0 
\end{cases} \)

2. \( f(x) = \begin{cases} 
  2x + 1, & x \leq -2 \\
  x, & -2 < x < 3 \\
  -2x + 3, & x \geq 3 
\end{cases} \)
3. \( f(x) = \begin{cases} 
-x^2 + 2, & x < 0 \\
x + 2, & x \geq 0 
\end{cases} \)

4. \( g(x) = \begin{cases} 
-8, & -2 < x < 0 \\
-5, & 0 \leq x < 2 \\
-2, & 2 \leq x < 6 \\
1, & 6 \leq x \leq 9 
\end{cases} \)

5. The cost, \( C \), of using an overnight delivery service to send a package depends on the weight, \( x \) (in ounces), of the package. The following step function gives the cost for the packages that weigh less than 1 pound.

a.) Sketch the graph of this function.

\[
C = \begin{cases} 
8.50, & 0 < x < 2 \\
9.75, & 2 \leq x < 4 \\
12.00, & 4 \leq x < 6 \\
13.25, & 6 \leq x < 8 \\
15.50, & 8 \leq x < 10 \\
16.75, & 10 \leq x < 12 
\end{cases} 
\]

b.) How much would it cost to ship packages that weigh 2.6, 6.9, and 11.2 ounces?