6.4 Function Notation

\[ C = 5n + 30 \] relations can be shown in equations, graphs, tables of value...

A function is a relation that has only one output \((y\text{-value})\) for each input \((x\text{-value})\).

**Examples**

\[
\begin{array}{ccc}
\text{Function} & & \text{Relation} \\
\includegraphics[width=0.3\textwidth]{function1} & & \includegraphics[width=0.3\textwidth]{relation1} \\
\includegraphics[width=0.3\textwidth]{function2} & & \includegraphics[width=0.3\textwidth]{relation2} \\
\end{array}
\]

Use the vertical line test on a graph. If a vertical line goes through more than one point it is not a function.

**Table of Values**

<table>
<thead>
<tr>
<th>Function</th>
<th>Relation</th>
</tr>
</thead>
</table>
| \( x \quad | y \quad | x \quad | y \\
| \( -1 \quad | 2 \quad | -1 \quad | 3 \\
| \( 0 \quad | 5 \quad | 0 \quad | 2 \\
| \( 1 \quad | 7 \quad | -1 \quad | 8 \\
| \( 3 \quad | 7 \quad | (3, 7) \quad | (4, 2) \quad | (3, -1) \\
| \( 4 \quad | 2 \quad | \)  \\
| \( 5 \quad | 7 \quad | \)

**Function notation**

\[ C(n) = 5n + 30 \] You can use this to...
\[ C(n) = 5n + 30 \]

You can use this to help with substituting.

Put the independent variable in brackets beside the dependent variable.

What is \( C(50) \)? Tells you to substitute \( n = 50 \).

\[ C(50) = 5(50) + 30 \]
\[ = 280 \]

Tricky: \( n = p + 10 \) So \( C(n) = 5n + 30 \) could be

\[ C\left(\frac{p+10}{p+10}\right) \Rightarrow C(p+10) = 5(p+10) + 30 \]
\[ = 5p + 50 + 30 \]
\[ = 5p + 80 \]

Whatever you put in the brackets replaces the independent variable.