Understood 1

What happens when you multiply something by 1? It stays the same. This is the premise of the "understood 1". When you have a variable such as x, it's implied that x is equal to $1x$ because $1 \cdot x = x$. It's also implied that x can be divided by 1 or raised to the power of 1.

Cases of the Understood 1:

$$1 \cdot x = x$$

$$\frac{x}{1} = x$$

$$x^1 = x$$

Which also means that

$$\frac{1x^1}{1} = x$$

Why is this useful? There are times when x may be multiplied by a fraction or raised to a different exponent where it'll be helpful to remember (and write out) the understood 1.

Example

Simplify the expression.

$$(x + 2x) \cdot x^3$$

Start by simplifying parentheses and remember that $x = 1x$.

$$(1x + 2x) \cdot x^3$$

$$(3x) \cdot x^3$$

Multiply and remember that $3x = 3x^1$.

$$3x^1 \cdot x^3$$

$$3x^4$$

Let's try another example using the understood 1.

Example

Simplify the expression.

$$\frac{1}{1(1x^1)} + 1\left(\frac{x}{1} + 1\right)$$

In this example the understood 1 has been written out multiple times. Let's simplify by removing the understood 1.

$$\frac{1}{1x^1} + 1\left(\frac{x}{1} + 1\right)$$

$$\frac{1}{x^1} + 1\left(\frac{x}{1} + 1\right)$$

$$\frac{1}{x}+1\left(\frac{x}{1}+1\right)$$

$$\frac{1}{x}+\frac{x}{1}+1$$

$$\frac{1}{x}+x+1$$