Evaluating expressions

Now that we have a background on important Algebra operations, we want to start evaluating expressions and solving equations.

Remember that an expression is a collection of terms, like $3x - 8$, $x - y$, or $abc + c^3 + ab$, while equations include an equals sign and set two expressions equal to one another, like $x + 5 = 12$ or $-2(3x + 1) = 3(-5x + 11) + 1$.

We'll start here with evaluating expressions, which will prepare us later to solve equations.

How to evaluate expressions

When we evaluate an expression, all we're doing is replacing variables with numbers, or substituting numbers for variables, and then simplifying the expression using order of operations.

Let's do an example.

Example

Given $x = 8$ and $y = 3$, evaluate the expression.

$$x - y$$

Plug in 8 for x, and 3 for y, and then simplify.

$$x - y$$

$$8 - 3$$

$$5$$

Let's try another example.

Example

If $a = 2$, $b = -1$, and $c = 3$, find the value of the expression.

$$abc + c^3 + ab$$

Plug in 2 for a, -1 for b, and 3 for c. When we substitute $a = 2$, $b = -1$, and $c = 3$, we get

$$abc + c^3 + ab$$

$$(2)(-1)(3) + 3^3 + (2)(-1)$$

Now simplify using order of operations. All the values within parentheses are simplified as much as they can be, and the parentheses that remain are there just to indicate multiplication, so we'll deal with them later in the order of operations.

We'll address the exponent first.

$$(2)(-1)(3) + 27 + (2)(-1)$$

Perform the multiplication from left to right.

$$(-2)(3) + 27 + (2)(-1)$$

$$-6 + 27 + (2)(-1)$$

$$-6 + 27 - 2$$

Perform the addition and subtraction, from left to right.

$$21 - 2$$

$$19$$