Greatest Common Factor

What is a Factor?

Factors are the numbers when multiplied together give us the answer: ie. $2 \times 3 = 6$

$2$ and $3$ are factors of $6$.

All factors of $6$ are $1, 2, 3, 6$.

What is the easiest way to factor a number? Let’s start at the beginning and the end! As an example, let’s factor the number $84$:

1. First let’s build a chart that will assist us in finding all the factors. We will put $1$ at the beginning of the chart and $84$ at the end.

\[
\begin{array}{cccccccc}
1 & & & & & & & 84 \\
\end{array}
\]

Next let’s build the chart from the “outside – in”. We know that $84$ is an even number, so it is divisible by $2$:

\[
\begin{array}{cccccccc}
1 & 2 & & & & & 42 & 84 \\
\end{array}
\]

Now we keep going with the next number in the sequence:

\[
\begin{array}{cccccccccccc}
1 & 2 & 3 & 4 & 6 & 7 & 12 & 14 & 21 & 28 & 42 & 84 \\
\end{array}
\]

And there we have all the factors of $84$, well almost! *(Remember that you can multiply a negative and negative and get a positive, so our factors would include all the positive numbers above and their negative friends!).* Using this method of moving one step at a time up the ladder and down the ladder, you will capture all the factors of a number.
**Common Factors**

Common factors are the numbers found in both factored sets of any numbers being compared:

Factors of 6
- 1
- 2
- 3
- 6

Factors of 12
- 1
- 2
- 3
- 4
- 6
- 12

Factors of 9
- 1
- 3
- 9

Common factors are the same numbers in each of the sets above: 1 and 3 are common factors. The **GREATEST** common factor is 3 (it’s bigger than 1).

What is the easiest way to find all the common factors? I would have to say the easiest way is to build your chart of factors for each number you are comparing and highlight the common numbers, then pick the **biggest** and you have the **GCF**!