

"I Can Apply the Greatest Common Factor and Least Common Multiple to help Solve Real-World Problems."

"I Can Factor an Expression as a Product of each term's GCF and Resulting Factor Pairs."

Greatest Common Factor

Factors are numbers that divide evenly into another number. Find the factors of each number below.

18

24

36

Circle the **Greatest Common Factor** of all of the factors above.

In the above example, we were concerned with all of the factors. We really only need to be concerned with the common factors so we use the following technique to find the GCF.

Find the GCF of 18, 24, and 36.

Find the GCF of 30 and 45

Find the GCF of 48 and 84.

Find the GCF of 32, 24 and 80

On Your Own

Find the GCF of 56 and 144.

Find the GCF of 48, 60, and 120

Factoring an Expression

Factoring the GCF out of an expression allows is to reverse the Distributive Property. Notice what happens at each level of the birthday cake.

1. Factor $12 + 18$

2. Factor $8x + 24$

On Your Own

3. Factor $12 + 30x$

3. Factor $36x + 18y + 45z$

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Greatest Common Factor

Factors are numbers that divide evenly into another number. Find the factors of each number below.

$$\begin{array}{r} 18 \\ \hline 1 \times 18 \\ 2 \times 9 \\ 3 \times 6 \end{array}$$

$$\begin{array}{r} 24 \\ \hline 1 \times 24 \\ 2 \times 12 \\ 3 \times 8 \\ 4 \times 6 \end{array}$$

$$\begin{array}{r} 36 \\ \hline 1 \times 36 \\ 2 \times 18 \\ 3 \times 12 \\ 4 \times 9 \\ 6 \times 6 \end{array}$$

Circle the **Greatest Common Factor** of all of the factors above.

In the above example, we were concerned with all of the factors. We really only need to be concerned with the common factors so we use the following technique to find the GCF.

Find the GCF of 18, 24, and 36.

$$\begin{array}{r} 2 \mid 18 \quad 24 \quad 36 \\ \hline 3 \mid 9 \quad 12 \quad 18 \\ \hline 3 \quad 4 \quad 6 \end{array}$$

$$\text{GCF} = 6$$

Find the GCF of 30 and 45

$$\begin{array}{r} 3 \mid 30 \quad 45 \\ \hline 5 \mid 10 \quad 15 \\ \hline 2 \quad 3 \end{array}$$

$$\text{GCF} = 15$$

Find the GCF of 48 and 84.

$$\begin{array}{r} 2 \mid 48 \quad 84 \\ \hline 2 \mid 24 \quad 42 \\ \hline 3 \mid 12 \quad 21 \\ \hline 4 \quad 7 \end{array}$$

$$\text{GCF} = 12$$

Find the GCF of 32, 24 and 80

$$\begin{array}{r} 2 \mid 32 \quad 24 \quad 80 \\ \hline 4 \mid 16 \quad 12 \quad 40 \\ \hline 4 \quad 3 \quad 10 \end{array}$$

$$\text{GCF} = 8$$

On Your Own

Find the GCF of 56 and 144.

$$\begin{array}{r}
 2 \overline{) 56 \quad 144} \\
 \underline{2 \quad 28 \quad 72} \\
 2 \quad 14 \quad 36 \\
 \underline{\quad 7 \quad 18}
 \end{array}$$

GCF = 8

Find the GCF of 48, 60, and 120.

$$\begin{array}{r}
 2 \overline{) 48 \quad 60 \quad 120} \\
 \underline{3 \quad 24 \quad 30 \quad 60} \\
 2 \quad 8 \quad 10 \quad 20 \\
 \underline{\quad 4 \quad 5 \quad 10}
 \end{array}$$

GCF = 12

Factoring an Expression

Factoring the GCF out of an expression allows us to reverse the Distributive Property. Notice what happens at each level of the birthday cake.

1. Factor

$$\begin{array}{r}
 2 \overline{) 12+18} \\
 \underline{2 \quad 6+9} \\
 2+3 \\
 \underline{\quad 6(2+3)}
 \end{array}
 \rightarrow 2(6+9) = 12+18$$

$$\rightarrow 6(2+3) = 12+18$$

2. Factor

$$\begin{array}{r}
 2 \overline{) 8x+24} \\
 \underline{2 \quad 4x+12} \\
 2 \overline{) 2x+6} \\
 \underline{\quad x+3} \\
 \underline{\quad 8(x+3)}
 \end{array}
 \rightarrow 2(4x+12) = 8x+24$$

$$\rightarrow 4(2x+6) = 8x+24$$

$$\rightarrow 8(x+3) = 8x+24$$

On Your Own

3. Factor

$$\begin{array}{r}
 3 \overline{) 12+30x} \\
 \underline{2 \quad 4+10x} \\
 (2+5x) \\
 \underline{6(2+5x)}
 \end{array}$$

3. Factor

$$\begin{array}{r}
 3 \overline{) 36x+18y+45z} \\
 \underline{3 \quad 12x+6y+15z} \\
 (4x+2y+5z) \\
 \underline{9(4x+2y+5z)}
 \end{array}$$