

7.4 - Greatest Common Factor

Bellwork

Find two numbers you can multiply to get c ,
and add to get b .

1. $c = -18, b = -3$

2. $c = -30, b = 1$

3. $c = 45, b = -14$

4. $c = -48, b = 2$

$$1.) \begin{array}{r|l} & -18 \\ 1 & -18 \\ 2 & -9 \\ \hline 3 & -6 \end{array} = -3$$

$$2.) \begin{array}{r|l} & -30 \\ -1 & 30 \\ -2 & 15 \\ -3 & 10 \\ \hline -5 & 6 \end{array} = 1$$

$$3.) \begin{array}{r|l} & 45 \\ -1 & -45 \\ -3 & -15 \\ \hline -5 & -9 \end{array} = -14$$

$$4.) \begin{array}{r|l} & -48 \\ -1 & 48 \\ -2 & 24 \\ -3 & 16 \\ -4 & 12 \\ \hline -6 & 8 \end{array} = 2$$

- Factor: One of two or more numbers that you can multiply together to get a product

Greatest Common Factor (GCF)

- Find the biggest factor that can divide into both numbers
- If there are variables: *letters*
 - Look at common variables (bases) *same letters*
 - Use the smallest exponent for each base (because this is the exponent that can go into all of them)

GCF examples

$$\begin{array}{r|l} 24 & 36 \\ 1 & 24 \\ 2 & 12 \\ 3 & 8 \\ 4 & 6 \end{array} \quad \begin{array}{r|l} 36 & 48 \\ 1 & 36 \\ 2 & 18 \\ 3 & 12 \\ 4 & 9 \end{array}$$

$$\begin{array}{r|l} 42 & 48 \\ 1 & 42 \\ 2 & 21 \\ 3 & 14 \\ 6 & 7 \end{array} \quad \begin{array}{r|l} 48 & 36 \\ 1 & 48 \\ 2 & 24 \\ 3 & 16 \\ 4 & 12 \\ 6 & 8 \end{array}$$

$$\begin{array}{r|l} 26 & 36 \\ 1 & 26 \\ 2 & 13 \end{array} \quad \begin{array}{r|l} 36 & 48 \\ 1 & 36 \\ 2 & 18 \\ 3 & 12 \\ 4 & 9 \\ 6 & 6 \end{array}$$

$$\begin{array}{r|l} 33 & 44 \\ 1 & 33 \\ 3 & 11 \end{array} \quad \begin{array}{r|l} 44 & 36 \\ 1 & 44 \\ 2 & 22 \\ 4 & 11 \end{array}$$

$$\begin{array}{r|l} 18 & 48 \\ 1 & 18 \\ 2 & 9 \\ 3 & 6 \\ 6 & 3 \end{array} \quad \begin{array}{r|l} 48 & 36 \\ 1 & 48 \\ 2 & 24 \\ 3 & 16 \\ 4 & 12 \\ 6 & 8 \end{array}$$

$$\begin{array}{r|l} 15 & 75 \\ 1 & 15 \\ 3 & 5 \end{array} \quad \begin{array}{r|l} 75 & 48 \\ 1 & 75 \\ 3 & 25 \\ 5 & 15 \end{array}$$

GCF

Find the GCF of all of the terms. *★ if they have the same letters - pick the smaller exponent*

$$6x^3y^5z^2 = 24x^3y^5z^2 \quad 18x^7y^6z^5$$

(xxx) (yyyyy) (zz) (xxxxxxx) (yyyyyy) (zzzzz)

Find the GCF of all of the terms.

$$6x^5y^4z^9 = 30x^{17}y^5z^{25} \quad 36x^5y^4z^9$$

Find the GCF of all of the terms.

$$5x^6y^8z^9 = 15x^6y^{10}z^{12} \quad 25x^{24}y^8z^9$$

- Find the GCF of all of the terms.

$$24x^3y^5z^2 \quad 18x^7y^6z^5 \quad 36x^5y^4z^9$$

$$\text{GCF} = 6x^3y^4z^2$$

Find the GCF of all of the terms.

$$15x^6y^{10}z^{12} \quad 30x^{17}y^5z^{25} \quad 25x^{24}y^8z^9$$

$$\text{GCF} = 5x^6y^5z^9$$

To factor out a GCF means to "divide out" the GCF.

Factor out GCF

1. Find GCF
2. Divide it out of all terms
3. Put GCF outside of parenthesis, everything else inside

2.) $\frac{12x^4}{4x^2} + \frac{8x^2}{4x^2}$

1.) $GCF = 4x^2$

3.) $4x^2(3x^2 + 2)$ ← this is factored

Factor each.

1. $\frac{12x^4}{4x^2} + \frac{8x^2}{4x^2}$ GCF = $4x^2$

$$4x^2(3x^2 + 2)$$

2. $\frac{14n^3}{7n} + \frac{7n}{7n}$ GCF = $7n$

$$7n(2n^2 + 1)$$

3. $\frac{14x^3}{7x^2} + \frac{63x^2}{7x^2}$ GCF = $7x^2$

$$7x^2(2x + 9)$$

4. $\frac{28x^5}{7x^3} - \frac{42x^3}{7x^3}$ GCF = $7x^3$

$$7x^3(4x^2 - 6)$$

Factor each.

1. $\frac{12x^4y}{6x^2y} - \frac{18x^2y^3}{6x^2y}$

$$\frac{6x^2y}{\text{GCF}}(2x^2 - 3y^2)$$

2. $\frac{3x^4}{3x} - \frac{9x^3}{3x} + \frac{3x^2}{3x} + \frac{24x}{3x}$

$$\frac{3x}{\text{GCF}}(x^3 - 3x^2 + x + 8)$$

3. $\frac{6y^3}{3y^3} - \frac{12y^5}{3y^3} + \frac{30y^6}{3y^3}$

$$\frac{3y^3}{\text{GCF}}(2 - 4y^2 + 10y^3)$$

Homework

WS 7.4 Greatest Common Factor