

#4 Factoring out the GCF

9/3/15

GCF: Greatest Common Factor

OR \rightarrow highest # that can be divided into each evenly.

(Ex) Factor each completely

$$\textcircled{A} \quad 36x^3 : 2^2 3^2 x^3 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x$$

$$\begin{array}{c} \wedge \\ 9 \quad 4 \\ \wedge \quad \wedge \\ 3 \quad 3 \quad 2 \quad 2 \end{array}$$

$$\textcircled{B} \quad 49b^3c^2 = 7 \cdot 7 bbb cc$$

$$\begin{array}{c} \wedge \\ 7 \quad 7 \end{array}$$

$$\textcircled{C} \quad 48rs^2t = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 r s s t$$

$$\begin{array}{c} \wedge \\ 2 \quad 24 \\ \wedge \\ 2 \cdot 12 \\ \wedge \\ 2 \cdot 6 \\ \wedge \\ 3 \cdot 2 \end{array}$$

$$\textcircled{D} \quad 60m^3n^4 = 2 \cdot 2 \cdot 3 \cdot 5 mmm nnnn$$

$$\begin{array}{c} \wedge \\ 6 \quad 10 \\ \wedge \quad \wedge \\ 2 \quad 3 \quad 2 \quad 5 \end{array}$$

Ex2) what is the GCF of $36x^2y$ and $54xy^2z$?

$$\begin{array}{l}
 36x^2y = 2 \cdot 2 \cdot 3 \cdot 3 \cdot x \cdot x \cdot y \\
 \wedge \quad \wedge \\
 6 \quad 6 \\
 \wedge \quad \wedge \\
 3 \quad 2 \quad 3 \quad 2 \\
 \\
 54xy^2z = 2 \cdot 3 \cdot 3 \cdot 3 \cdot x \cdot y \cdot y \cdot z \\
 \wedge \\
 2 \quad 27 \\
 \wedge \\
 3 \quad 9 \\
 \wedge \\
 3 \quad 3
 \end{array}$$

Only circle what they have in common

$$\begin{array}{l}
 \text{GCF} = 2 \cdot 3 \cdot 3 \cdot x \cdot y \\
 18xy
 \end{array}$$

Ex3) what is the GCF of $4x^2$, $12xy$?

$$\begin{array}{l}
 4x^2 = 2 \cdot 2 \cdot x \cdot x \\
 \wedge \quad \wedge \\
 2 \quad 2 \\
 \\
 12xy = 2 \cdot 2 \cdot 3 \cdot x \cdot y \\
 \wedge \quad \wedge \\
 6 \quad 2 \\
 \wedge \\
 3 \quad 2
 \end{array}$$

$$\begin{array}{l}
 \text{GCF} = 2 \cdot 2 \cdot x \\
 4x
 \end{array}$$

Factor $4x^2 + 12xy$

$$4x(x + 3y)$$

leftover go inside parenthesis

check $4x^2 + 12xy$

Ex3) Factor $2a^2 - 6a$

$$2a^2 = \cancel{2} \cancel{a} a$$

$$-6a = \underline{-1} \cdot \underline{2} \cdot \underline{3} a$$

$$\boxed{2a(a-3)} \quad \text{Final Answer}$$

check $2a^2 - 6a$
multiply
it Back
together

Ex4) Factor $9y^3 - 15y^2 + 3y$

$$9y^3 = \cancel{3} \cancel{3} y y y$$

$$-15y^2 = \underline{-1} \cdot \underline{3} \cdot \underline{5} y y$$

$$3y = \cancel{3} y \quad \text{nothing there} \quad \text{put 1}$$

$$\text{GCF} = 3y$$

$$\boxed{3y(3y^2 - 5y + 1)} \quad \text{Final Answer}$$

check $9y^3 - 15y^2 + 3y$

Ex5) $4ab^3 + 12a^2b^2 - 8a^3b$
 $4ab(b^2 + 3ab - 2a^2)$