$\boxed{5\text{-}2}$ Prime Factorization

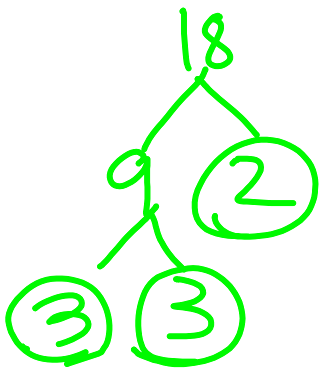
<u>prime</u> - # that has <u>EXACTLY</u> 2 factors 1 and itself
0 & 1 are "special" - belong to "property" group

<u>factor</u> - # that divides evenly into a whole #
(or the #s in a mult. problem)

$$\underbrace{5 \times 6}_{\text{factors}} = 30 \rightarrow \text{product}$$

<u>prime factorization</u> - expresses a # as a product of its prime factors

In elem. school: used factor tree



$2 \times 3 \times 3$

Middle/High school: use bobsled

Think: 2, 3, 5, 7, 11, 13...

$$\begin{array}{r|l} 2 & 18 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

$$\boxed{2 \cdot 3 \cdot 3}$$

To bobsled:

1st → Find smallest prime # that goes evenly

2nd → ÷ write quotient (answer) below

3rd → start over (step 1) until the bottom # is PRIME

4th → write answer using #s on left & bottom as a product

MUST be LEAST to GREATEST

Ex 1)

$$\begin{array}{r|l} 2 & 36 \\ \hline 2 & 18 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

$$\boxed{2 \cdot 2 \cdot 3 \cdot 3}$$

Think: 2, 3, 5, 7, 11, 13…

$$\begin{array}{r} 18 \\ 2\overline{)36} \\ -2\downarrow \\ \hline 16 \\ -16 \\ \hline 0 \end{array}$$

$$\begin{array}{r|l} 2 & 36 \\ \hline 3 & 18 \\ \hline 3 & 6 \\ \hline & 2 \end{array}$$

This is ok

$2 \cdot 3 \cdot 3 \cdot 2$

This is wrong not L→G

MUST write as $2 \cdot 2 \cdot 3 \cdot 3$

2) 27

$$\begin{array}{r|l} 3 & 27 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

$$\boxed{3 \cdot 3 \cdot 3}$$

3.) 17

$\boxed{\text{prime}}$

$1 \cdot 17$ wrong

not prime

4) 112

$$\begin{array}{r|l} 2 & 112 \\ \hline 2 & 56 \\ \hline 2 & 28 \\ \hline 2 & 14 \\ \hline & 7 \end{array}$$

$$\boxed{2 \cdot 2 \cdot 2 \cdot 7}$$