TH-PA Pre-Algebra Week 17 1/30

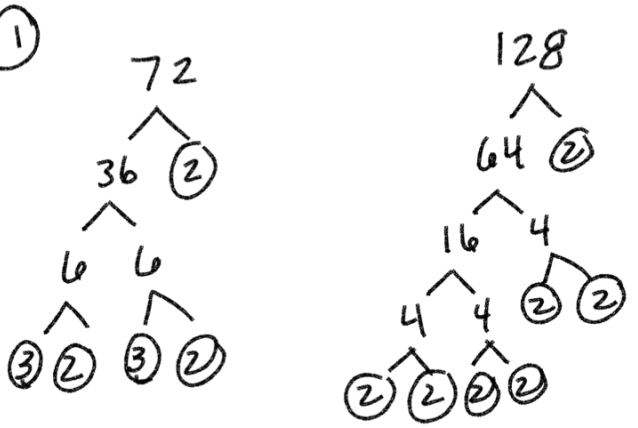
72, 128

1.) Prime Factorize

2.) GCF

3.) Reduce

4.) LCM

① 

$72: 3\cdot3\cdot2\cdot2\cdot2 = 3^2\cdot2^3$

$128: 2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2 = 2^7$

② GCF: Greatest Common Factor "Factor" → small

Group commons

$72: 3\cdot3\cdot2\cdot2\cdot2$

$128: 2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2$

GCF: $2\cdot2\cdot2 = \boxed{8}$

③ Reduce $\frac{72}{128} = \frac{3\cdot3\cdot2\cdot2\cdot2}{2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2} = \boxed{\frac{9}{16}}$ Kill/Cancel commons

$\frac{72 \div GCF}{128 \div GCF}$ $\frac{72\div8}{128\div8} = \frac{9}{16}$

④ LCM

$72: 3\cdot3\cdot2\cdot2\cdot2$

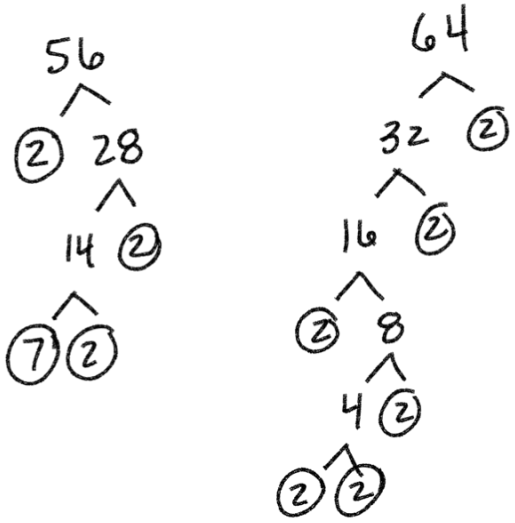
$\boxed{128}: 2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2$

Group → Thanos

$9\cdot128 = \boxed{1152}$

Multiple → bigger

56, 64



1.) Prime Factorize

2.) GCF

3.) Reduce $\frac{56}{64}$

4.) LCM

$56: 7 \cdot \overset{1}{2} \cdot \overset{2}{2} \cdot \overset{3}{2} = 7 \cdot 2^3$

$64: \underbrace{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}_{1\ 2\ 3\ 4\ 5\ 6} = 2^6$

GCF

$56: 7 \cdot 2 \cdot 2 \cdot 2$

$64: 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

GCF : $2 \cdot 2 \cdot 2 = \boxed{8}$

Reduce $\frac{56: 7 \cdot 2 \cdot 2 \cdot 2}{64: 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \boxed{\frac{7}{8}}$

LCM

$56: 7 \cdot 2 \cdot 2 \cdot 2$

$\boxed{64}: 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

LCM → Thanos

$7 \cdot 64 = \boxed{448}$

$20x^3y^4,\quad 24x^2y^6$

Prime factorize coefficients: 20, 24

$20: 5 \cdot 2 \cdot 2$

$24: 3 \cdot 2 \cdot 2 \cdot 2$

1.) GCF Group Commons

$20x^3y^4 = 5 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y$

$24x^2y^6 = 3 \cdot 2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y$

x^3 y^4 x^2 y^6

$20x^3y^4$

$24x^2y^6$

GCF: $2 \cdot 2 \cdot x^2 \cdot y^4 = \boxed{4x^2y^4}$

GCF: Find the smallest exponent

$\boxed{4x^2y^4}$

2.) Reduce

$$\frac{20x^3y^4}{24x^2y^6} = \frac{5 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y}{3 \cdot 2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y} = \frac{5x}{6y^2}$$

x^3 y^4 x^2 y^6

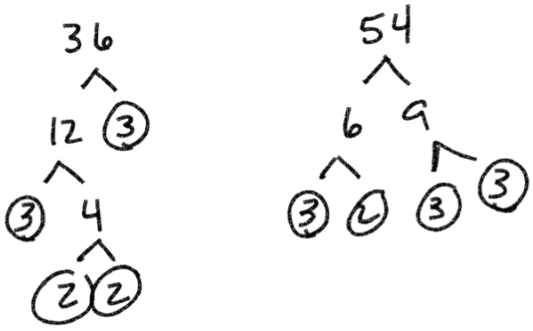
$\frac{20x^3y^4}{24x^2y^6} = \frac{5x}{6y^2}$

$\frac{x^3}{x^2} = x^{3-2} = x^1$ (positive top)

$\frac{y^4}{y^6} = y^{4-6} = y^{-2} = \frac{1}{y^2}$ (negative bottom)

$36a^5b^3c^{10}$, $54a^7bc^5$

Prime Factors



GCF pick the smallest

$36a^5b^3c^{10} = 3\cdot3\cdot2a^5bc^5$

$54a^7bc^5$

$\boxed{18a^5bc^5}$

$[36: 3\cdot3\cdot2\cdot2]$

$[54: 3\cdot3\cdot3\cdot2]$

Reduce $\dfrac{36a^5b^3c^{10}}{54a^7bc^5} = \boxed{\dfrac{2b^2c^5}{3a^2}}$

$a^{5-7} = a^{-2}$ $b^{3-1} = b^2$ $c^{10-5} = c^5$

$4^5 = 4\cdot4\cdot4\cdot4\cdot4$

$3\cdot3\cdot3\cdot3\cdot3\cdot3\cdot3 = 3^7$

$a\cdot a\cdot a\cdot a\cdot a\cdot a\cdot a\cdot a = a^8$

$3x^5$ $x=2$

$3\cdot x\cdot x\cdot x\cdot x\cdot x$

$3\cdot2\cdot2\cdot2\cdot2\cdot2 = 96$

↳ exponents first!

PEMDAS

~~$3(2)^5 = 6^5$~~

$3(2)^5 = 3(32) = 96$

Order of Operations

$a^4 b^2 c * a^2 b^2 c^4$

$a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot c \cdot a \cdot a \cdot b \cdot b \cdot c \cdot c \cdot c \cdot c$

4 2 1 2 2 4

$a^6 b^4 c^5$

When you multiply exponents, you just add

$a^4 b^2 c * a^2 b^2 c^4$

$a^{4+2} = a^6$

$b^{2+2} = b^4$

$c^{1+4} = c^5$

$a^6 b^4 c^5$

$x^7 y^8 z^2 * x^3 y^5 z^7$

$x^{7+3} = x^{10}$

$y^{8+5} = y^{13}$

$z^{2+7} = z^9$

$x^{10} y^{13} z^9$

Divide exponents

$$\frac{x^9 y^6 z^4}{x^7 y^1 z^8}$$

Divide → subtract

$$x^{9-7} = x^2$$

$$y^{6-1} = y^5$$

$$z^{4-8} = z^{-4}$$

$$\frac{x^2 y^5}{z^4}$$

$$\frac{a^4}{a^4} = a^{4-4} = a^0 = 1$$

$$\frac{a^4}{a^4} = \frac{\overset{1}{\cancel{a}}\cdot\overset{1}{\cancel{a}}\cdot\overset{1}{\cancel{a}}\cdot\overset{1}{\cancel{a}}}{\underset{1}{\cancel{a}}\cdot\underset{1}{\cancel{a}}\cdot\underset{1}{\cancel{a}}\cdot\underset{1}{\cancel{a}}} = \frac{1}{1} = 1$$

$$3^0 = 1 \qquad 1{,}070^0 = 1$$

$$(a^2)^3 = a^2 \cdot a^2 \cdot a^2 = a^{2+2+2} = a^6$$

$$(a^2)^3 = a^{2\cdot 3} = a^6$$

$$(3a^4b^7)^2 = 3^2 a^8 b^{14}$$