


CHAPTER 5 FACTORING

PRIME NUMBER: A NUMBER WITH NO FACTORS OTHER THAN ITSELF AND 1.

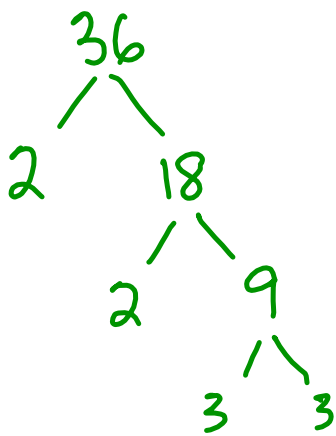
2 3 5 7 11 13 17 19 23 29



KNOW THESE

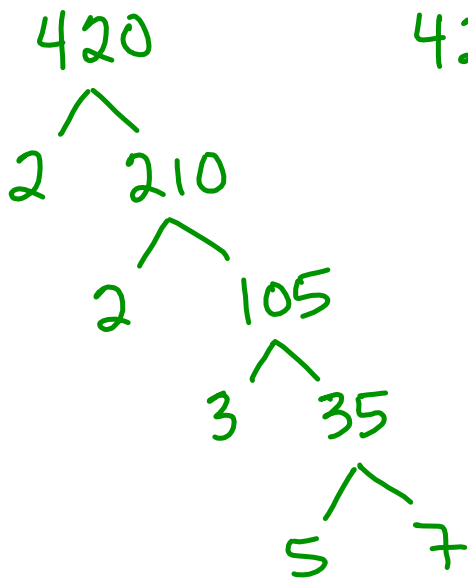
Ex. 1

FIND THE PRIME FACTORIZATION OF 36.



$$36 = 2 \cdot 2 \cdot 3 \cdot 3$$
$$= 2^2 \cdot 3^2$$

Ex. 2



$$420 = 2 \cdot 2 \cdot 3 \cdot 5 \cdot 7$$

GREATEST COMMON FACTOR

Ex. 3

a.) $GCF(150, 225) = 75$

150: 1, 2, 3, 5, 6, 10, 15, 25, 30, 50, 75, 150

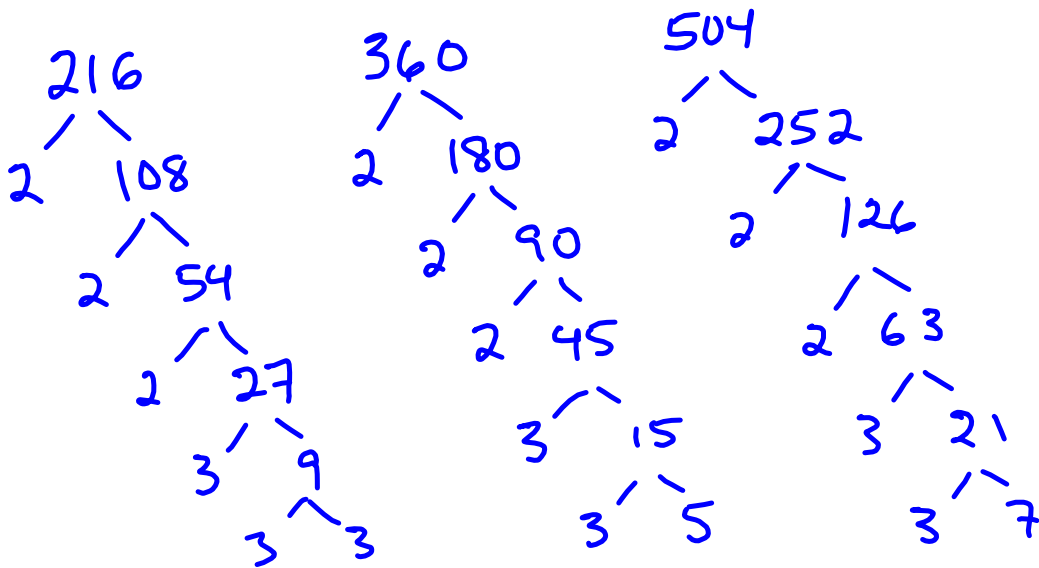
225: 1, 3, 5, 9, 15, 25, 45, 75, 225

$$\begin{array}{r} 150 \\ 2 \overline{) 150} \\ \underline{30} \\ 3 \overline{) 30} \\ \underline{25} \\ 5 \overline{) 25} \\ \underline{5} \\ 5 \end{array}$$

$$\begin{array}{r} 225 \\ 3 \overline{) 225} \\ \underline{75} \\ 3 \overline{) 75} \\ \underline{25} \\ 5 \overline{) 25} \\ \underline{5} \\ 5 \end{array}$$

$$\begin{array}{l} 150 = 2 \cdot 3 \cdot 5 \cdot 5 \\ 225 = 3 \cdot 3 \cdot 5 \cdot 5 \end{array} = 75$$

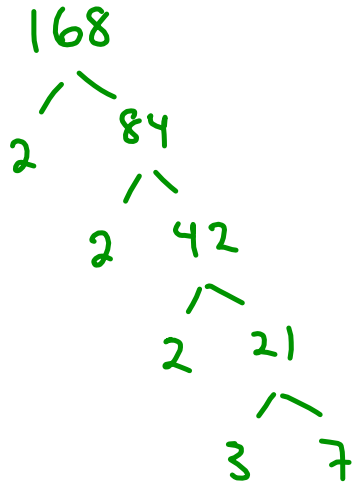
b.) $GCF(216, 360, 504) = 72$



216 =	2 · 2 · 2 · 3 · 3 · 3
360 =	2 · 2 · 2 · 3 · 3 · 5
504 =	2 · 2 · 2 · 3 · 3 · 7

$$2^3 \cdot 3^2 = 72$$

$$c) \text{ GCF}(55, 168) = 1$$



Ex. 4

$$a.) \text{GCF}(15x^2, 9x^3) = 3x^2$$

$$\begin{array}{cc} 15 & 9 \\ \swarrow & \searrow \\ 3 & 5 \end{array} \quad \begin{array}{cc} 9 & \\ \swarrow & \searrow \\ 3 & 3 \end{array}$$

$$\begin{array}{l} 15x^2 = 3 \cdot 5 \cdot x \cdot x \\ 9x^3 = 3 \cdot 3 \cdot x \cdot x \cdot x \end{array}$$

$$b) \text{GCF}(12x^2y^2, 30x^2yz, 42x^3y) = 6x^2y$$

$$12x^2y^2 = 2 \cdot 2 \cdot 3 \cdot x \cdot x \cdot y \cdot y$$

$$30x^2yz = 2 \cdot 3 \cdot 5 \cdot x \cdot x \cdot y \cdot z$$

$$42x^3y = 2 \cdot 3 \cdot 7 \cdot x \cdot x \cdot x \cdot y$$

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

Ex. 5

a) $25a^2 + 40a = 5a(5a + 8)$

$25a^2 = 5 \cdot 5 \cdot a \cdot a$ \uparrow
5a

$40a = 2 \cdot 2 \cdot 2 \cdot 5 \cdot a$

b) $6x^4 - 12x^3 + 3x^2 = 3x^2(2x^2 - 4x + 1)$

$6x^4 = 2 \cdot 3 \cdot x \cdot x \cdot x \cdot x$

$12x^3 = 2 \cdot 2 \cdot 3 \cdot x \cdot x \cdot x$ $3x^2$

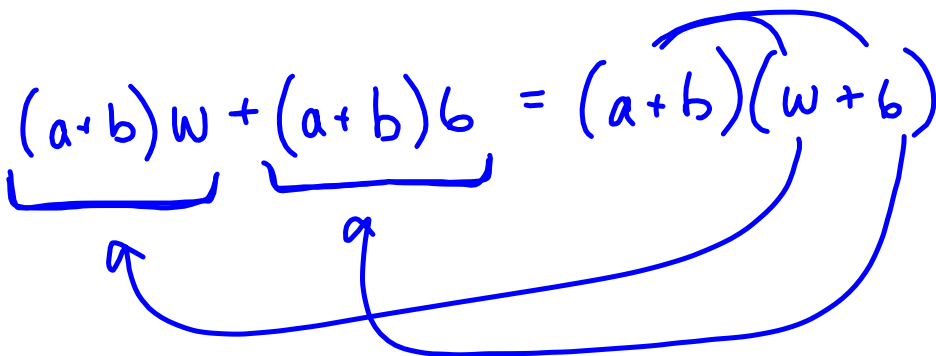
$3x^2 = 3 \cdot x \cdot x$

c) $x^2y^5 + x^6y^3 = x^2y^3(y^2 + x^4)$

$x^2y^5 = x^2 y^3 y^2$

$x^6y^3 = x^2 x^4 y^3$

Ex. 6

$$\textcircled{a} \quad \underbrace{(a+b)w} + \underbrace{(a+b)b} = (a+b)(w+b)$$


$$aw + bw + ba + bb = aw + ba + bw + bb$$

F 0 1 2

$$\textcircled{b} \quad \underbrace{x(x+2)} + \underbrace{3(x+2)} = (x+3)(x+2)$$

$$\textcircled{c} \quad y(y-3) - 1(y-3) = (y-1)(y-3)$$

Ex. 7

$$\begin{aligned} \textcircled{a} \quad 3x - 3y &= 3(x - y) \\ &= -3(-x + y) = -3(y - x) \end{aligned}$$

$$\begin{aligned} \textcircled{b} \quad a - b &= 1(a - b) \\ &= -1(-a + b) = -(b - a) \end{aligned}$$

$$\textcircled{c} \quad -x^3 + 2x^2 - 8x = -x(x^2 - 2x + 8)$$