1.2 - Applications of Primes (GCF & LCM, PS & PC)

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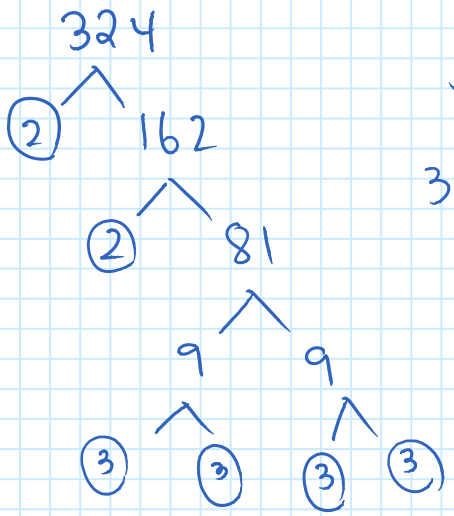
* We can use a Prime Factorization statement to PROVE if a number is:

① Perfect Square - 2 identical groups

② Perfect Cube - 3 identical groups

Ex. Is 324 a perfect square, perfect cube, neither, both?



$324 = 2^2 \cdot 3^4$

$324 = 2 \cdot 3^2 \cdot 2 \cdot 3^2$

$324 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

324 is a P.S. because 2 identical groups.

Lowest Common Multiple (LCM)

* The LCM is the smallest number that is a multiple of 2 given (natural) numbers.

Method ① List all the multiples of each number

Ex. Find the LCM of 9 and 12

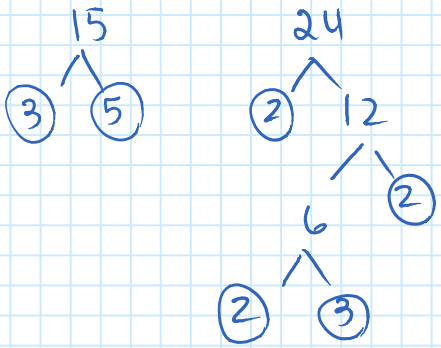
9: 9, 18, 27, 36, ...

12: 12, 24, 36, 48, ...

LCM (9, 12) = 36

Method ② use a PF statement, take the greatest occurance of each prime factor then multiply these together:

Ex. Find the LCM of 15 and 24



$15 = 3 \cdot 5$

$24 = 2^3 \cdot 3$

$LCM(15,24) = 2^3 \cdot 3 \cdot 5$

$= 120$

Greatest common Factor (GCF)

* The GCF is the largest (natural) number that is a factor of both numbers.

Method ① use a factor table and find the largest common number:

Ex. what is the GCF of 16 and 24?

16	
1	16
2	8
4	4

24	
1	24
2	12
3	8
4	6

$GCF(16,24) = 8$

Method ② compare the 2 PF statements. Identify the max. number of primes common to both, then multiply those to get the GCF.

Ex. Find the GCF of 30 and 96.

	30
2	15
5	3
3	1

	96
2	48
2	24
2	12
2	6
2	3
3	1

$30 = 2 \cdot 3 \cdot 5$

$96 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

$GCF(30, 96) = 2 \cdot 3$

$GCF(30, 96) = 6$