Chapter 1 Lesson 1
Factors and Multiples

Product – answer to multiplication problem

factors

$7 \times 8 = 56$

factor

$56 \div 8 = 7$

Prime number – a number that has only 2 factors (itself and 1)

Examples: $7 \rightarrow 7 \times 1 = 7$

$5 \rightarrow 5 \times 1 = 5$

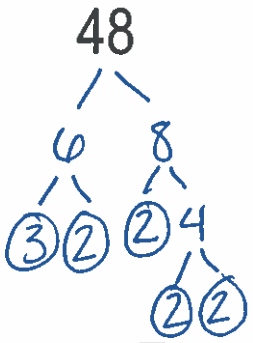
Composite number – a number that has more than 2 factors

Examples:

10
1×10
2×5

12
1×12
2×6
3×4

Prime Factorization Examples



$2 \times 2 \times 2 \times 2 \times 3 = 48$

$2^4 \times 3 = 48$

Greatest Common Factor (GCF) – largest of the common factors

Example:

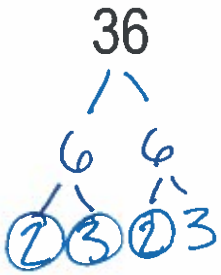
36

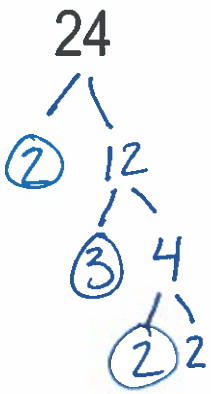
1x36
2x18
3x12
4x9
6x6

24

1x24
2x12
3x8
4x6

GCF Use Prime Factorization





* Circle when both sides have the number

$2 \times 2 \times 3 = 12$

GCF = 12

Least Common Multiple (LCM) – smallest number that is common between a list of multiples

Examples:

12

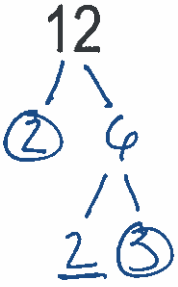
$12 \times 1 = 12$
$12 \times 2 = 24$
$12 \times 3 = 36$
$12 \times 4 = 48$
$12 \times 5 = 60$

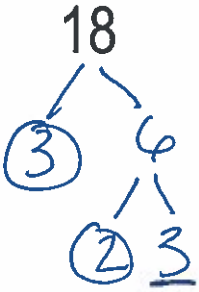
18

$18 \times 1 = 18$
$18 \times 2 = 36$
$18 \times 3 = 54$

LCM = 36

LCM Use Prime Factorization:

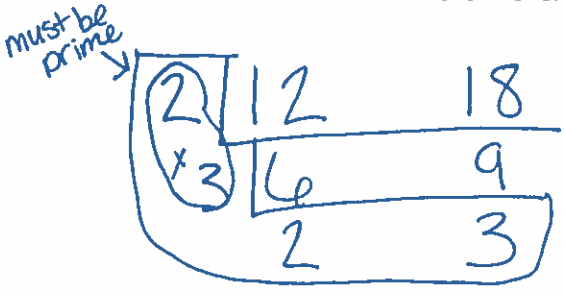




* Find all common numbers + circle then multiply left overs too!

$2 \times 3 \times 2 \times 3 = 36$

Cake / Ladder Method Examples:



GCF = left side only

LCM = makes L ~~simplified~~

GCF = 6 = 2×3

LCM = 36 = 2·3·2·3

$$\begin{array}{r} {}^{2}49 \\ \times\ 3 \\ \hline 147 \end{array}$$

Examples continued:

GCF = 5·2 = 10

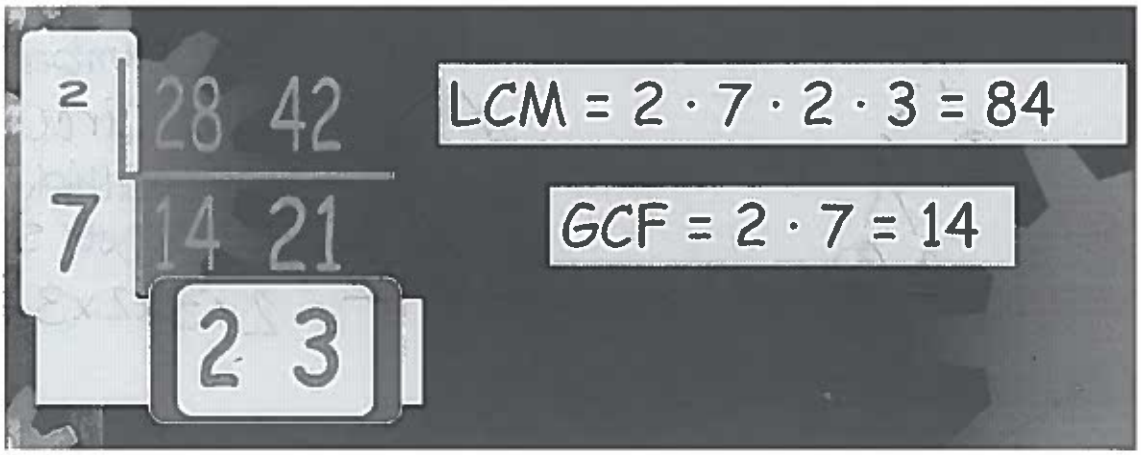
LCM = 5·2·3·4 = 120

$$\begin{array}{r|ll} 5 & 30 & 40 \\ \hline 2 & 6 & 8 \\ \hline & 3 & 4 \end{array}$$

$$\begin{array}{r|ll} 7 & 49 & 21 \\ \hline & 7 & 3 \end{array}$$

GCF = 7

LCM = 7·7·3 = 147



How to Do Prime Factorization Using a Factor Tree

Step 1 – Start with a composite number.

48

Step 2 – Write down a multiplication problem that equals this number or any pair of factors of this number.

6 x 8 = 48

How to Do Prime Factorization Using a Factor Tree

Step 3 – Find factors of these factors.

6 x 8 = 48

2 x 3 x 2 x 4 = 48

How to Do Prime Factorization Using a Factor Tree

Step 4 – Find factors of these numbers until all factors are prime numbers.

6 x 8 = 48

2 x 3 x 2 x 4 = 48

2 x 3 x 2 x 2 x 2 = 48

How to Do Prime Factorization Using a Factor Tree

Step 5 – Write the numbers from least to greatest.

6 x 8 = 48

2 x 3 x 2 x 2 x 2 = 48

2 x 2 x 2 x 2 x 3 = 48

How to Do Prime Factorization Using a Factor Tree

Step 6 – Count how many numbers are the same and write exponents for them.

6 x 8 = 48

2 x 3 x 2 x 2 x 2 = 48

(2)x(2)x(2)x(2)x 3 = 48

$2^4 \times 3 = 48$