

# LCM Least Common Multiple.

$\text{LCM}(a, b) =$  <sup>minimum</sup> Number divisible by both the numbers

For eg,  $\text{lcm}(2, 4) = 4$

$\text{lcm}(3, 7) = 21$

NOTE \* We have two numbers say  $a$  &  $b$

$$d = \text{gcd}(a, b) \Rightarrow d/a \text{ \& } d/b$$

$$f = \frac{a}{d} ; g = \frac{b}{d}$$

$$\Rightarrow a = f \times d ; b = g \times d$$

let's say  $\text{lcm} = c$

$$\text{lcm}(a, b) = \text{lcm}(fd, gd)$$

~~c~~ ~~also~~

$c$  divides  $a$  &  $b$ , and it should divide  $fd$  &  $gd$  as well.

\* We know that  $f$  &  $g$  will have no other common factor

For eg,  $a = 9 ; b = 18 ; d = \text{gcd}(9, 18)$

$$f = 1 ; g = 2 ; d = 9$$

Now,  $f$  &  $g$  have no common factors

\*  $a = fd$  ,  $b = gd$

$\boxed{lcm = f * g * d}$  when  $f$  &  $g$  have  
no other common factor

↓  
This is how the above conditions are satisfied.

\* MORE INFO:

LCM is the number that is divisible by both  $a$  &  $b$ . This means shouldn't the factor of  $\odot lcm(a, b)$  contain the number  $a$  &  $b$



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For example  $12, 18$   
 $\text{lcm} =$

$$= a * b$$

$$= f * d * g * d \quad [d \rightarrow \text{removed, since repeating}]$$

$$= f * g$$

$$\therefore \text{lcm} = f * g * d$$

$$\begin{aligned} * \Rightarrow a * b &= f * d * g * d \\ &= d (f * g * d) \\ &= d (\text{lcm}) \end{aligned}$$

$$\boxed{a * b = \text{hcf} * \text{lcm}}$$

$$\therefore \boxed{\text{lcm}(a, b) = \frac{a * b}{\text{hcf}(a, b)}}$$



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