

Bharathidasan University

Tiruchirappalli - 620 024 Tamil Nadu, India

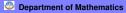
Programme: M.Sc., Mathematics

Course Title :Theory of Numbers COurse Code : 21M04CC

Least Common Multiple

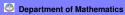
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Theorem If c is a common multiple of
a, a, a, ..., an , then
$$[a_1, a_2, ..., a_n][c.$$

(a) If h is the lon of a, a, ..., an , then
o, th, tzh, ..., comprise all the
common multiple of a, a, ..., an.
(or) Any common multiple of a, a, ..., an
g a - multiple of least common multiple
of a, a, ..., an.

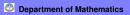


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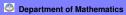
Ξ.

Suppose that
$$0 < r \le h$$
.
 $a_i/h \le a_i \mid m$ for $i=1,2,...n$.
 $a_i/h \le a_i \mid m + h(-9)$ $[x=1/2] = 2 a_i/b x + cy$
 $a_i \mid m - 2h$
 $a_i \mid$



.:
$$\gamma = 0$$

From (D), $m = zh$
 $h \mid M$
Any common multiple is a multiple of
least common multiple.
Theorem: (D) Let $m > 0$. Then $Emb, ma] = m Ea, 6]$
 $\otimes Ea, b] \cdot (a, b) = |ab|$



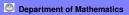
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Proof: ① Let
$$H = [ma, mb]$$
.
 $h = [a, b]$
we prove that $H = mh$
Since h is a common multiple of
a and b
 $\Rightarrow a|h and b|h$
 $\Rightarrow ma|mh & Mb|mh$
 $\Rightarrow ma|mh & Mb|mh$
 $\Rightarrow ma|mh & Mb|mh$

By the previous there
$$H = H = Mh$$
.
Since H is a common multiple of magnetic $H = H = H = Mh$.
 $= H = H = Mh$ and $H = Mh = Hh$
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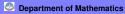
Let
$$h = [a, b]$$
. $h = ab$.
Since $h = a$ multiple of a , $f = me I$ such that
 $h = ma = m = m = 0$
NOW since $h = a$ multiple of b also,
 $b \mid h$
 $\Rightarrow b \mid ma$
But $(a,b)=1$ $\Rightarrow b \mid ma$
 $\Rightarrow ab \mid ma$
 $\Rightarrow ab \mid ma$
 $\Rightarrow ab \mid ma$



abis a multiple of both a k b k math
is the lam of
$$a \not a b$$

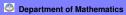
From $(a,b) = 1$, then $[a,b] = ab$.
 $(a,b] = ab$.

$$\begin{bmatrix} a_{3} & b_{3} & b_{3} & b_{3} \\ = \frac{ab}{g^{2}} \\ = \end{bmatrix} g \begin{bmatrix} a_{3} & b_{3} \\ g & b_{3} \end{bmatrix} g = ab \\ m=g \text{ in the part (0 of the theorem)} \\ = \end{bmatrix} \begin{bmatrix} a_{3} & b_{3} \end{bmatrix} g = ab \\ = \sum \begin{bmatrix} a_{3} & b_{3} \end{bmatrix} g = ab \\ = \sum \begin{bmatrix} a_{3} & b_{3} \end{bmatrix} (a_{3}b) = ab . \\ = \sum \begin{bmatrix} a_{3} & b_{3} \end{bmatrix} (a_{3}b) = ab . \\ g_{3}b=ab \\ g$$



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$$[a, b] = [a, -b]$$

 $[a, b] (a, b) = [a, -b] (a, -b)$
 $[a, b] (a, b) = [a, -b] (a, -b)$
 $= [a(-b)]$
 $= [a|[b]]$
 $= [ab]$
 $[a, b] (a, b) = [ab]$
 $[a, b] (a, b) = [ab]$
For the case $(a < 0, brown)$, the details are left as
 $exercise$.



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670,6 b=ma is reduced as product of smaller 6 mumbers msa 10. 4.6 = 3.8 2= 3-8 = = 7-6-1 24 E) facb, 120,620 reducible St. ヘロア 人間 アメヨア 人間 アー

