

MATHEMATICS NOTES FOR 5TH CLASS (FOR KHYBER PAKHTUNKHWA)

Unit No: 2	HCF and LCM Exercise : 1
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1. Find the HCF of the following by using prime factorization method.

(a) 58, 75

$$\begin{array}{r} 2 \overline{) 58} \\ 29 \end{array} \quad \begin{array}{r} 2 \overline{) 72} \\ 2 \overline{) 36} \\ 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \end{array}$$

Prime factorization of 58 = 2×29
 prime factorization of 72 =
 $2 \times 2 \times 2 \times 3 \times 3$
 Common prime factor = 2
 HCF = 2

(b) 21, 48

$$\begin{array}{r} 3 \overline{) 21} \\ 7 \overline{) 7} \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{) 48} \\ 2 \overline{) 24} \\ 3 \overline{) 12} \\ 2 \overline{) 4} \\ 2 \end{array}$$

Prime factorization of
 $21 = 3 \times 7$
Prime factorization of 48
 $= 2 \times 2 \times 3 \times 2 \times 2$
Common prime factor = 3
HCF = 3

(c) 56, 70

$$\begin{array}{r} 2 \overline{) 56} \\ 2 \overline{) 28} \\ 7 \overline{) 14} \\ 2 \end{array} \quad \begin{array}{r} 2 \overline{) 70} \\ 7 \overline{) 35} \\ 5 \overline{) 5} \\ 1 \end{array}$$

Prime factorization of
 $56 = 2 \times 2 \times 7 \times 2$
 prime factorization of
 $70 = 2 \times 7 \times 5$
 Common prime factor = 2, 7
 HCF = $2 \times 7 = 14$ Ans

(d) 45, 90

$$\begin{array}{r} 5 \overline{) 45} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{) 90} \\ 5 \overline{) 45} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

Prime factorization of
 $45 = 5 \times 3 \times 3$
 Prime factorization of
 $90 = 2 \times 5 \times 3 \times 3$
 Common prime factor = 5, 3, 3
 HCF = $5 \times 3 \times 3 = 45$ Ans

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(e) 42 , 49 $\begin{array}{r} 2 \overline{)42} \\ 3 \overline{)21} \\ 7 \overline{)7} \\ 1 \end{array}$ $\begin{array}{r} 7 \overline{)49} \\ 7 \overline{)7} \\ 1 \end{array}$ Prime factorization of $42 = 2 \times 3 \times 7$ prime factorization of $49 = 7 \times 7$ Common prime factor = 7 HCF=7 Ans	(f) 15 , 18 , 50 $\begin{array}{r} 3 \overline{)15} \\ 5 \overline{)5} \\ 1 \end{array}$ $\begin{array}{r} 3 \overline{)18} \\ 2 \overline{)6} \\ 3 \overline{)3} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)50} \\ 2 \overline{)25} \\ 5 \overline{)5} \\ 1 \end{array}$ Prime factorization of $15 = 3 \times 5 \times 1$ Prime factorization of $18 = 2 \times 3 \times 3 \times 1$ Common factorization of = $50 = 2 \times 5 \times 5 \times 1$ Common prime factor = 1
(g) 42, 54, 64 $\begin{array}{r} 2 \overline{)42} \\ 3 \overline{)21} \\ 7 \overline{)7} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)54} \\ 3 \overline{)27} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)64} \\ 2 \overline{)32} \\ 2 \overline{)16} \\ 2 \overline{)8} \\ 2 \overline{)4} \\ 2 \overline{)2} \\ 1 \end{array}$ Prime factorization of $42 = 2 \times 3 \times 7$ Prime factorization of $54 = 2 \times 3 \times 3 \times 3$ Prime factorization of $64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$ Prime common factor = 2 HCF = 2	(h) 18, 30, 90 $\begin{array}{r} 2 \overline{)18} \\ 3 \overline{)9} \\ 3 \overline{)9} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)30} \\ 3 \overline{)15} \\ 5 \overline{)5} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)90} \\ 5 \overline{)45} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ 1 \end{array}$ Prime factorization of $18 = 2 \times 3 \times 3$ Prime factorization of $30 = 2 \times 3 \times 5$ Prime factorization of $90 = 2 \times 5 \times 3 \times 3$ Common factors = 2, 3 HCF= $2 \times 3 = 6$

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(i) 12 , 24 ,36 $\begin{array}{r} 2 \overline{) 12} \\ 2 \overline{) 6} \\ 3 \overline{) 3} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{) 24} \\ 2 \overline{) 12} \\ 2 \overline{) 6} \\ \hline 3 \end{array}$ $\begin{array}{r} 2 \overline{) 36} \\ 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ \hline 1 \end{array}$ Prime factorization of $12 = 2 \times 2 \times 3$ Prime factorization of $24 = 2 \times 2 \times 2 \times 3$ Prime factorization of $36 = 2 \times 2 \times 3 \times 3$ Common factors = 2, 2, 3 $HCF = 2 \times 2 \times 3 = 12$	(j) 18 , 36 ,76 $\begin{array}{r} 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{) 36} \\ 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{) 76} \\ 5 \overline{) 35} \\ 7 \overline{) 7} \\ \hline 1 \end{array}$ Prime factorization of $18 = 2 \times 3 \times 3$ Prime factorization of $36 = 2 \times 2 \times 3 \times 3$ Prime factorization of $76 = 2 \times 5 \times 7$ Common factor = 2 $HCF = 2$
(k) 5 , 35 , 40 $\begin{array}{r} 5 \overline{) 5} \\ \hline 1 \end{array}$ $\begin{array}{r} 5 \overline{) 35} \\ 7 \overline{) 7} \\ \hline 1 \end{array}$ $\begin{array}{r} 5 \overline{) 40} \\ 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \overline{) 2} \\ \hline 1 \end{array}$ Prime factorization of 5 = 5 x 1 Prime factorization of $35 = 5 \times 7 \times 1$ Prime factorization of $40 = 5 \times 2 \times 2 \times 2 \times 1$ Common factors = 5 $HCF = 5$	(l) 13 , 52 , 18 $\begin{array}{r} 13 \overline{) 13} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{) 52} \\ 2 \overline{) 26} \\ 13 \overline{) 13} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ \hline 1 \end{array}$ Prime factorization of 13 = 13 x 1 Prime factorization of $52 = 13 \times 2 \times 2$ Prime factorization of $18 = 13 \times 2 \times 3$ Common factors = 13 x 1 $HCF = 13$

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Q2: Find the HCF of the following numbers by using division method.

(a) 13, 65 $\begin{array}{r} 5 \\ 13 \overline{) 65} \\ \underline{65} \\ 0 \end{array}$ HCF = 13	(b) 25, 75 $\begin{array}{r} 3 \\ 25 \overline{) 75} \\ \underline{75} \\ 0 \end{array}$ HCF = 25
(c) 42, 98 $\begin{array}{r} 2 \\ 42 \overline{) 98} \\ \underline{84} \quad 3 \\ 14 \quad 42 \\ \underline{-42} \\ 0 \end{array}$ HCF = 14	(d) 16, 20, 70 $\begin{array}{r} 1 \\ 16 \overline{) 20} \\ \underline{16} \quad 4 \\ 4 \quad 16 \\ \underline{-16} \\ 0 \end{array} \quad \begin{array}{r} 17 \\ 70 \overline{) 68} \quad 2 \\ 2 \quad 68 \\ \underline{-68} \\ 0 \end{array}$ HCF = 2
(e) 56, 84, 88 $\begin{array}{r} 1 \\ 56 \overline{) 84} \\ \underline{-56} \quad 2 \\ 28 \quad 56 \\ \underline{-56} \\ 0 \end{array} \quad \begin{array}{r} 3 \\ 28 \overline{) 88} \\ \underline{84} \quad 7 \\ 4 \quad 28 \\ \underline{-28} \\ 0 \end{array}$ HCF = 4	(f) 57, 76, 95 $\begin{array}{r} 1 \\ 57 \overline{) 76} \\ \underline{57} \quad 3 \\ 19 \quad 57 \\ \underline{-57} \\ 0 \end{array} \quad \begin{array}{r} 5 \\ 19 \overline{) 95} \\ \underline{-95} \\ 0 \end{array}$ HCF = 19
(g) 16, 32, 96 $\begin{array}{r} 2 \\ 16 \overline{) 32} \\ \underline{-32} \\ 0 \end{array} \quad \begin{array}{r} 6 \\ 16 \overline{) 96} \\ \underline{-96} \\ 0 \end{array}$ HCF = 16	(h) 20, 40, 80 $\begin{array}{r} 2 \\ 20 \overline{) 40} \\ \underline{-40} \\ 0 \end{array} \quad \begin{array}{r} 4 \\ 20 \overline{) 80} \\ \underline{-80} \\ 0 \end{array}$ HCF = 20

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(i) 48, 76, 96

$$\begin{array}{r}
 1 \\
 \overline{48 \overline{) 48}} \\
 - 48 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 24 \\
 \overline{96 \overline{) 96}} \\
 - 96 \\
 \hline
 0
 \end{array}
 \quad
 \text{HCF} = 4$$

(j) 24, 48, 72

$$\begin{array}{r}
 2 \\
 \overline{48 \overline{) 48}} \\
 - 48 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 3 \\
 \overline{72 \overline{) 72}} \\
 - 72 \\
 \hline
 0
 \end{array}$$

HCF = 24

(k) 51, 65, 75

$$\begin{array}{r}
 1 \\
 \overline{65 \overline{) 65}} \\
 - 65 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 3 \\
 \overline{51 \overline{) 51}} \\
 - 51 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 75 \\
 \overline{75 \overline{) 75}} \\
 - 75 \\
 \hline
 0
 \end{array}$$

HCF = 1

(l) 13, 39, 78

$$\begin{array}{r}
 13 \\
 \overline{39 \overline{) 39}} \\
 - 39 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 78 \\
 \overline{78 \overline{) 78}} \\
 - 78 \\
 \hline
 0
 \end{array}$$

HCF = 13

3. The length of the two ropes is 24 meters and 14 meters. If Ali wants to cut the ropes into pieces of equal length without any rope left, find out what will be the maximum length of each piece?

Length of one rope = 24 meter
 Length of 2nd rope = 14 meter
 We will find HCF of 24 and 14
 Common Prime Factor = 2
 So, HCF = 2
 Maximum length of each rope = 2 meter

$$\begin{array}{r}
 24 \\
 \overline{2 \overline{) 24}} \\
 - 4 \\
 \hline
 20 \\
 - 20 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 14 \\
 \overline{2 \overline{) 14}} \\
 - 2 \\
 \hline
 12 \\
 - 12 \\
 \hline
 0
 \end{array}$$

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4. For Independence Day Celebrations, 52 students in white, 65 students in green dresses and 39 students in blue dress are to be arranged in equal rows in such a way that students of same color dress are in each row. What is the greatest number of students that could be in each row?

Q4) Student in white dress=52 Student in green dress=65 Student in blue dress=39 Common Prime Factor =13 So, HCF= 13 Student each row=13 student	we will find HCF of 52, 65, 39 $\begin{array}{r} 13 \overline{)39} \\ \underline{39} \\ 0 \end{array}$ $\begin{array}{r} 13 \overline{)52} \\ \underline{26} \\ 26 \\ \underline{26} \\ 0 \end{array}$ $\begin{array}{r} 13 \overline{)65} \\ \underline{52} \\ 13 \\ \underline{13} \\ 0 \end{array}$ $13 = 13 \times 3$ $52 = 13 \times 2 \times 2$ $65 = 13 \times 5$
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5. Find the greatest number that divides 16, 24 and 48 completely.

By Division method. $\begin{array}{r} 1 \overline{)24} \\ \underline{16} \quad 2 \\ 8 \overline{)16} \\ \underline{16} \\ 0 \end{array}$ $\begin{array}{r} 6 \overline{)48} \\ \underline{48} \\ 0 \end{array}$	Greatest number = 8 HCF = 8
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6. Ibrahim and Marwa are preparing first aid kits for the students. They have 30 perforated adhesive bandages, 60 triangular bandages and 75 rectangular bandages. They must distribute these equally in the kits, with nothing left over. What is the greatest number of kits they can make with this quantity of bandages?

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By division method	Greatest number of kits = 15 HCF is = 15
$\begin{array}{r} 2 \\ 2 \overline{) 60} \\ \underline{-60} \\ 0 \end{array}$ $\begin{array}{r} 2 \\ 3 \overline{) 75} \\ \underline{60} \quad 2 \\ 15 \overline{) 30} \\ \underline{-30} \\ 0 \end{array}$	

Unit 2

Exercise No: 2

Find the LCM of the following numbers using prime factorization.

(a) 3, 21 $\begin{array}{r} 3 \overline{) 3} \\ \underline{3} \\ 1 \end{array}$ $\begin{array}{r} 7 \overline{) 21} \\ \underline{21} \\ 1 \end{array}$ Prime factorization 3 = 3 × 1 Prime factorization of 21 = 7 × 3 × 1 Product of common prime factors and non common factor = LCM = 21	(b) 12, 80 $\begin{array}{r} 2 \overline{) 12} \\ \underline{2} \overline{) 6} \\ \underline{2} \overline{) 3} \\ \underline{2} \overline{) 1} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{) 80} \\ \underline{2} \overline{) 40} \\ \underline{2} \overline{) 20} \\ \underline{2} \overline{) 10} \\ \underline{2} \overline{) 5} \\ 5 \end{array}$ Prime factorization 12 = 2 × 3 × 2 Prime factorization of 80 = 2 × 2 × 2 × 2 × 5 Product of common prime factor = 2 × 2 Product non-common prime factor = 3 × 2 × 2 × 5 LCM = common × non-common = 2 × 2 × 2 × 2 × 3 × 5 = 240
(c) 20, 15 $\begin{array}{r} 2 \overline{) 20} \\ \underline{2} \overline{) 10} \\ \underline{5} \overline{) 5} \\ \underline{5} \overline{) 1} \\ 1 \end{array}$ $\begin{array}{r} 3 \overline{) 15} \\ \underline{3} \overline{) 5} \\ \underline{5} \overline{) 1} \\ 1 \end{array}$ Prime factorization 20 = 2 × 2 × 5	d) 4, 10, 16 $\begin{array}{r} 2 \overline{) 4} \\ \underline{2} \overline{) 2} \\ \underline{2} \overline{) 1} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{) 10} \\ \underline{2} \overline{) 5} \\ \underline{5} \overline{) 1} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{) 16} \\ \underline{2} \overline{) 8} \\ \underline{2} \overline{) 4} \\ \underline{2} \overline{) 2} \\ \underline{2} \overline{) 1} \\ 1 \end{array}$

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Prime factorization of $15=3 \times 5$ Product of common prime factor= 5 Product of non-common factor= $2 \times 2 \times 3$ LCM= $2 \times 2 \times 3 \times 5 = 60$	Prime factorization of $4=2 \times 2$ Prime factorization of $10=2 \times 5$ Prime factorization of $16=2 \times 2 \times 2 \times 2$ Product of common prime factor= $2 \times 5 \times 2 \times 2 \times 2$ LCM= $2 \times 2 \times 2 \times 2 \times 5 = 80$
(e) 9, 18, 27 $\begin{array}{r} 3 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)18} \\ 2 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 3 \overline{)27} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ Prime factorization of $9=3 \times 3$ Prime factorization of $18=2 \times 3 \times 3$ Prime factorization of $27=3 \times 3 \times 3$ Product of common prime factor= 3×3 Product of non-common factor= 2×3 LCM = $3 \times 3 \times 2 \times 3 = 54$	(f) 10, 20, 35 $\begin{array}{r} 2 \overline{)10} \\ 2 \overline{)5} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)20} \\ 2 \overline{)10} \\ 2 \overline{)5} \\ \hline 1 \end{array}$ $\begin{array}{r} 5 \overline{)35} \\ 5 \overline{)7} \\ \hline 1 \end{array}$ Prime factorization of $10=2 \times 5$ Prime factorization of $20=2 \times 2 \times 5$ Prime factorization of $35=5 \times 7 \times 1$ Product of common prime factor= $5 \times 2 \times 2 \times 7$ LCM= $2 \times 5 \times 2 \times 7 = 140$
(g) 20, 60, 75 $\begin{array}{r} 2 \overline{)20} \\ 2 \overline{)10} \\ 2 \overline{)5} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)60} \\ 2 \overline{)30} \\ 2 \overline{)15} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 5 \overline{)75} \\ 5 \overline{)15} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ Prime factorization of $20=2 \times 2 \times 5$ Prime factorization of $60=2 \times 2 \times 3 \times 5$	(h) 30, 45, 90 $\begin{array}{r} 2 \overline{)30} \\ 2 \overline{)15} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 5 \overline{)45} \\ 5 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 5 \overline{)90} \\ 3 \overline{)18} \\ 3 \overline{)6} \\ 2 \overline{)2} \\ \hline 1 \end{array}$ Prime factorization of $30=2 \times 3 \times 5$ Prime factorization of $45=3 \times 3 \times 5$

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Prime factorization of $75=5 \times 2 \times 3$ Product of common prime factor= $2 \times 2 \times 5 \times 3 \times 5$ $LCM=2 \times 2 \times 3 \times 5 \times 5 = 300$	Prime factorization of $90=5 \times 3 \times 3 \times 2$ Product of common prime factor= $5 \times 3 \times 3 \times 2$ $LCM=2 \times 3 \times 3 \times 5 = 90$
i) 16, 24, 36 $\begin{array}{r} 2 \overline{)16} \\ 2 \overline{)8} \\ 2 \overline{)4} \\ 2 \overline{)2} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)24} \\ 2 \overline{)12} \\ 2 \overline{)6} \\ 3 \overline{)3} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)36} \\ 2 \overline{)18} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ Prime factorization of $16=2 \times 2 \times 2 \times 2$ Prime factorization of $24=2 \times 2 \times 2 \times 3$ Prime factorization of $36=2 \times 2 \times 3 \times 3$ Product of common and non- common prime factor= $2 \times 2 \times 2 \times 3 \times 3 \times 2$ $LCM=2 \times 2 \times 2 \times 3 \times 2 \times 3=144$	(j) 18, 60, 75 $\begin{array}{r} 2 \overline{)18} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)60} \\ 2 \overline{)30} \\ 5 \overline{)15} \\ 3 \overline{)3} \\ \hline 1 \end{array} \quad \begin{array}{r} 5 \overline{)75} \\ 5 \overline{)15} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ Prime factorization of $18=2 \times 3 \times 3$ Prime factorization of $60=2 \times 2 \times 5 \times 3$ Prime factorization of $75=5 \times 5 \times 3$ Product of common and non- common prime factor= $2 \times 5 \times 3 \times 3 \times 2 \times 5$ $LCM=2 \times 3 \times 5 \times 3 \times 2 \times 5 = 900$
(k) 49, 51, 56 $\begin{array}{r} 7 \overline{)49} \\ 7 \overline{)7} \\ \hline 1 \end{array} \quad \begin{array}{r} 17 \overline{)51} \\ 3 \overline{)3} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)56} \\ 7 \overline{)28} \\ 2 \overline{)4} \\ 2 \overline{)2} \\ \hline 1 \end{array}$ Prime factorization of $49=7 \times 7$ Prime factorization of $51=17 \times 3$ Prime factorization of $56=2 \times 7 \times 2 \times 2$	(l) 13, 65, 71 $\begin{array}{r} 13 \overline{)13} \\ \hline 1 \end{array} \quad \begin{array}{r} 13 \overline{)65} \\ 5 \overline{)5} \\ \hline 1 \end{array} \quad \begin{array}{r} 7 \overline{)71} \\ \hline 1 \end{array}$ Prime factorization of $13=13 \times 1$ Prime factorization of $65=13 \times 5$ Prime factorization of $71=71 \times 1$ Product of common and non- common prime factors= $13 \times 5 \times 71$ $LCM = 13 \times 5 \times 71 = 4615$

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Product of common and non-common prime factor = $7 \times 17 \times 3 \times 7 \times 2 \times 2 \times 2$ LCM = $7 \times 7 \times 3 \times 17 \times 2 \times 2 \times 3 = 19,992$	
(Q2) Find the LCM of the following numbers using division.	
(a) 14, 70 $\begin{array}{r} 2 \overline{)14-70} \\ 7 \overline{)7-35} \\ 5 \overline{)1-5} \\ 1 \overline{)1-1} \end{array}$ LCM: $2 \times 7 \times 5 = 70$	(b) 15, 30 $\begin{array}{r} 5 \overline{)15-30} \\ 3 \overline{)3-6} \\ 2 \overline{)1-2} \\ 1 \overline{)1-2} \end{array}$ LCM = $5 \times 3 \times 2 = 30$
(c) 45, 90 $\begin{array}{r} 5 \overline{)45-90} \\ 3 \overline{)9-18} \\ 3 \overline{)3-6} \\ 2 \overline{)1-2} \\ 1 \overline{)1-1} \end{array}$ LCM: $5 \times 3 \times 3 \times 2 = 90$	(d) 35, 60, 75 $\begin{array}{r} 5 \overline{)35-60-75} \\ 3 \overline{)7-12-15} \\ 2 \overline{)7-4-5} \\ 7 \overline{)7-2-5} \end{array}$ LCM: $5 \times 3 \times 2 \times 7 \times 2 \times 5 = 2100$
(e) 7, 21, 49 $\begin{array}{r} 7 \overline{)7, 21, 49} \\ 3 \overline{)1, 3, 7} \\ 7 \overline{)1, 1, 7} \\ 1 \overline{)1, 1, 1} \end{array}$ LCM: $7 \times 3 \times 7 = 147$	(f) 25, 45, 95 $\begin{array}{r} 5 \overline{)25, 45, 95} \\ 3 \overline{)5, 9, 19} \\ 5 \overline{)3, 19} \end{array}$ LCM: $5 \times 3 \times 5 \times 3 \times 19 = 4275$
(g) 16, 32, 48 $\begin{array}{r} 2 \overline{)16, 32, 48} \\ 2 \overline{)8, 16, 24} \\ 2 \overline{)4, 8, 12} \\ 2 \overline{)2, 4, 6} \\ 1 \overline{)1, 2, 3} \end{array}$	(h) 28, 32, 40 $\begin{array}{r} 2 \overline{)28, 32, 40} \\ 2 \overline{)14, 16, 20} \\ 2 \overline{)7, 8, 10} \\ 2 \overline{)7, 4, 5} \\ 7 \overline{)7, 2, 5} \end{array}$

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LCM : $2 \times 2 \times 2 \times 2 \times 2 \times 3 = 96$ (i) 12,14,26 $\begin{array}{r} 2 \overline{)12,14,26} \\ 2 \overline{)6,7,13} \\ 3,7,13 \end{array}$ LCM: $2 \times 2 \times 3 \times 7 \times 13 = 1092$	LCM: $2 \times 2 \times 2 \times 2 \times 7 \times 2 \times 5 = 1120$ (j) 10,20,25 $\begin{array}{r} 2 \overline{)10,20,25} \\ 2 \overline{)5,10,25} \\ 1,2,5 \end{array}$ LCM: $2 \times 5 \times 2 \times 5 = 100$
(k) 7,14,21 $\begin{array}{r} 7 \overline{)7,14,21} \\ 1,2,3 \end{array}$ LCM: $7 \times 2 \times 3 = 42$	(l) 8,32,42 $\begin{array}{r} 2 \overline{)4,16,21} \\ 7 \overline{)2,8,21} \\ 2 \overline{)2,8,3} \\ 2 \overline{)1,4,3} \\ 1,2,3 \end{array}$ LCM: $2 \times 2 \times 7 \times 2 \times 2 \times 2 \times 3 = 672$
3. Find the minimum length of the ribbon which can be completely cut into pieces of length 45 cm, 75 cm and 85 cm without any leftover. Using division method 45,75,85 $\begin{array}{r} 5 \overline{)45,75,85} \\ 3 \overline{)9,15,17} \\ 3,5,17 \end{array}$ LCM: $5 \times 3 \times 3 \times 5 \times 17 = 3825$ Minimum length of a ribbon = 3825cm	4. Find the smallest number that can be completely divided by 42, 38 and 16 without leaving any remainder. $\begin{array}{r} 2 \overline{)42,38,16} \\ 7 \overline{)21,19,8} \\ 2 \overline{)3,19,8} \\ 2 \overline{)3,19,4} \\ 3,19,2 \end{array}$ LCM: $2 \times 7 \times 2 \times 2 \times 3 \times 19 \times 2 = 5384$
5. The tour buses for Badshahi Mosque leaves the station every 25 minutes, for interior city every 15	6. Boxes having 22 centimeter, 35 centimeter and 50 centimeter height respectively are to be stacked next to each

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minutes and for the zoo every 30 minutes. If the three buses leave the station simultaneously at 11:05 am, find out the time when the three buses will next leave the station simultaneously. By division method $\begin{array}{r} 5 \overline{)25,15,30} \\ 3 \overline{)5,3,6} \\ 5,1,2 \end{array}$ LCM = $5 \times 3 \times 5 \times 2 = 150$ Or 2:30 minutes busses will leave the station simultaneously = 11:05 $\begin{array}{r} 2:30 \\ 1:35 \text{ P.M} \end{array}$	other. What is the shortest possible height at which the three types of boxes will be at the same height? $\begin{array}{r} 2 \overline{)22,35,50} \\ 5 \overline{)11,35,25} \\ 11,7,5 \end{array}$ LCM = $2 \times 5 \times 11 \times 7 \times 5 = 3850$ Shortest possible height = 3850cm
7. Students of grade 5 have mathematics test after every 3 days, English test after every 6 days and science test after every 9 days. If all the three tests were conducted today, find out that when will the three tests be conducted next on the same day.	$\begin{array}{r} 3 \overline{)3,6,9} \\ 1,2,3 \end{array}$ LCM = $3 \times 2 \times 3 = 18$ days Tests will be conducted after = 18 days

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Review Exercise

(1) Encircle the correct option.

(a) The HCF of 20, 48 and 56 is 4.

(i) 4 (ii) 3 (iii) 5 (iv) 1

(b) The HCF of two or more than two numbers which have no common prime factor, is always 1.

(i) 1000 (ii) 100 (iii) 10 **(iv) 1**

(c) Prime factorization of 16 is $2 \times 2 \times 2 \times 2$.

(i) 2×8 (ii) 1×16 **(iii) $2 \times 2 \times 2 \times 2$** (iv) $2 \times 4 \times 2$

(d) The LCM of 33, 66 and 81 is 1782.

(i) 1770 (ii) 1872 **(iii) 1782** (iv) 1287

(e) The LCM of two or more prime numbers is always equal to their product.

(i) prime factor (ii) quotient (iii) LCM **(iv) product.**

Q2: Find the HCF of the following numbers using prime factorization.

(a) 15, 18 $\begin{array}{r} 3 \overline{)15} \\ \underline{5} \\ 5 \\ \underline{5} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)18} \\ \underline{3} \\ 9 \\ \underline{3} \\ 3 \\ \underline{3} \\ 0 \end{array}$ Prime factorization of 15 = 3×5 Prime factorization of 18 = $2 \times 3 \times 3$ HCF = 3	(b) 10, 20 $\begin{array}{r} 2 \overline{)10} \\ \underline{5} \\ 5 \\ \underline{5} \\ 0 \end{array}$ $\begin{array}{r} 2 \overline{)20} \\ \underline{2} \\ 10 \\ \underline{2} \\ 5 \\ \underline{5} \\ 0 \end{array}$ Prime factorization of 10 = 2×5 Prime factorization of 20 = $2 \times 2 \times 5$ HCF = $2 \times 5 = 10$
(c) 25, 40 $\begin{array}{r} 5 \overline{)25} \\ \underline{5} \\ 5 \\ \underline{5} \\ 0 \end{array}$ $\begin{array}{r} 5 \overline{)40} \\ \underline{2} \\ 20 \\ \underline{2} \\ 10 \\ \underline{2} \\ 5 \\ \underline{5} \\ 0 \end{array}$ Prime factorization of 25 = 5×5	(d) 56, 88 $\begin{array}{r} 2 \overline{)56} \\ \underline{2} \\ 28 \\ \underline{2} \\ 14 \\ \underline{7} \\ 7 \\ \underline{7} \\ 0 \end{array}$ $\begin{array}{r} 2 \overline{)88} \\ \underline{2} \\ 44 \\ \underline{2} \\ 22 \\ \underline{11} \\ 11 \\ \underline{11} \\ 0 \end{array}$ Prime factorization of 56 = $2 \times 2 \times 2 \times 7$ Prime factorization of 88 = $2 \times 2 \times 2 \times 11$

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Prime factorization of 40 $= 5 \times 2 \times 2$ HCF = 5	Prime factorization of 88= $2 \times 2 \times 11 \times 2$ HCF = $2 \times 2 \times 2 = 8$
(e) 10, 18, 22 $\begin{array}{r} 2 \overline{)10} \\ 5 \overline{)5} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)18} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ Prime factorization of 10 = 2×5 Prime factorization of 18 $= 2 \times 3 \times 3$ Prime Factorization of 22 = 11×2 HCF = 2	(f) 20, 40, 82 $\begin{array}{r} 2 \overline{)20} \\ 2 \overline{)10} \\ 5 \overline{)5} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)40} \\ 2 \overline{)20} \\ 2 \overline{)10} \\ 5 \overline{)5} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)82} \\ 41 \overline{)41} \\ \hline 1 \end{array}$ Prime factorization of 20 $= 2 \times 2 \times 5$ Prime factorization of 40 $= 2 \times 2 \times 2 \times 5$ Prime Factorization of 82 = 2×41 HCF = 2
(g) 16, 38, 98 $\begin{array}{r} 2 \overline{)16} \\ 2 \overline{)8} \\ 2 \overline{)4} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)38} \\ 19 \overline{)19} \\ \hline 1 \end{array}$ $\begin{array}{r} 2 \overline{)98} \\ 7 \overline{)49} \\ 7 \overline{)7} \\ \hline 1 \end{array}$ Prime factorization of 16 $= 2 \times 2 \times 2 \times 2$ Prime factorization of 38 = 2×19 Prime Factorization of $98 = 2 \times 7 \times 7$ HCF = 2	(h) 39, 51, 75 $\begin{array}{r} 13 \overline{)39} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 17 \overline{)51} \\ 3 \overline{)3} \\ \hline 1 \end{array}$ $\begin{array}{r} 3 \overline{)75} \\ 3 \overline{)15} \\ 5 \overline{)5} \\ \hline 1 \end{array}$ Prime factorization of 39 = 13×3 Prime factorization of 51 = 17×3 Prime Factorization of $75 = 3 \times 3 \times 5$ HCF = 3
(3) Find the HCF of the following numbers using division.	
(a) 20, 50 $\begin{array}{r} 2 \\ 20 \overline{)50} \\ -40 \\ \hline 10 \end{array}$ $\begin{array}{r} 2 \\ 10 \overline{)20} \\ -20 \\ \hline 0 \end{array}$ HCF = 10	(b) 15, 45 $\begin{array}{r} 3 \\ 15 \overline{)45} \\ -45 \\ \hline 0 \end{array}$ HCF = 15

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(c) 60,70,80 $\begin{array}{r} 1 \\ 60 \overline{) 70} \quad 8 \\ -60 \quad 2 \\ \hline 10 \overline{) 60} \quad 80 \\ -60 \quad 0 \\ \hline 0 \end{array}$ HCF = 10	(d) 22,28,32 $\begin{array}{r} 1 \\ 22 \overline{) 28} \quad 3 \\ -22 \quad 6 \\ \hline 6 \overline{) 22} \quad 16 \\ -18 \quad 1 \\ \hline 4 \overline{) 6} \quad 32 \\ -4 \quad 2 \\ \hline 2 \overline{) 4} \quad 0 \\ -4 \quad 0 \\ \hline 0 \end{array}$ HCF = 10
(e) 44, 55, 99 $\begin{array}{r} 1 \\ 44 \overline{) 55} \quad 9 \\ -44 \quad 4 \\ \hline 11 \overline{) 44} \quad 99 \\ -44 \quad 0 \\ \hline 0 \end{array}$ HCF = 11	(f) 34,48,62 $\begin{array}{r} 1 \\ 34 \overline{) 48} \quad 31 \\ -34 \quad 2 \\ \hline 14 \overline{) 34} \quad 62 \\ -28 \quad 2 \\ \hline 6 \overline{) 14} \quad 0 \\ -12 \quad 3 \\ \hline 2 \overline{) 6} \quad 0 \\ -6 \quad 0 \\ \hline 0 \end{array}$ HCF = 2
(g) 30, 45, 70 $\begin{array}{r} 1 \\ 30 \overline{) 45} \quad 4 \\ -30 \quad 15 \\ \hline 15 \overline{) 30} \quad 70 \\ -30 \quad 1 \\ \hline 0 \end{array}$ HCF = 5	(h) 26, 52, 65 $\begin{array}{r} 2 \\ 26 \overline{) 52} \quad 2 \\ -52 \quad 2 \\ \hline 0 \end{array}$ HCF = 13

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(Q4) Find the LCM of the following numbers using prime factorization.

(a) 2, 5 $\begin{array}{r} 2 \overline{)2} \\ \underline{2} \\ 1 \end{array} \quad \begin{array}{r} 5 \overline{)5} \\ \underline{5} \\ 1 \end{array}$ Prime factorization of 2=2x1 Prime factorization of 5=5x1 Product of common factor x non common prime factors = 2 x 5 = 10 LCM = 10	(b) 3, 7 $\begin{array}{r} 3 \overline{)3} \\ \underline{3} \\ 1 \end{array} \quad \begin{array}{r} 7 \overline{)7} \\ \underline{7} \\ 1 \end{array}$ Prime factorization of 3=3x1 Prime factorization of 7=7x1 Product of common factor x non common prime factors = 3 x 7 = 21 LCM = 21
(c) 5, 8 $\begin{array}{r} 5 \overline{)5} \\ \underline{5} \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{)8} \\ \underline{2} \\ 4 \\ \underline{2} \\ 2 \\ \underline{2} \\ 1 \end{array}$ Prime factorization of 5=5x1 Prime factorization of 8=2x2x2 Product of common factor x non common prime factors = 5 x 2 x 2 x 2 = 40 LCM = 40	(d) 4, 10, 16 $\begin{array}{r} 2 \overline{)4} \\ \underline{2} \\ 2 \\ \underline{2} \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{)10} \\ \underline{2} \\ 5 \\ \underline{5} \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{)16} \\ \underline{2} \\ 8 \\ \underline{2} \\ 4 \\ \underline{2} \\ 2 \\ \underline{2} \\ 1 \end{array}$ Prime factorization of 4=2x2x1 Prime factorization of 10=2x5 Prime factorization of 16=2x2x2x2 Product of common x non common prime factors = 2 x 5 x 2 x 2 x 2 = 80 LCM=80
(e) 20, 25, 50 $\begin{array}{r} 2 \overline{)20} \\ \underline{2} \\ 10 \\ \underline{2} \\ 5 \\ \underline{5} \\ 1 \end{array} \quad \begin{array}{r} 5 \overline{)25} \\ \underline{5} \\ 5 \\ \underline{5} \\ 1 \end{array} \quad \begin{array}{r} 5 \overline{)50} \\ \underline{5} \\ 10 \\ \underline{2} \\ 5 \\ \underline{5} \\ 1 \end{array}$ Prime factorization of 20=2x2x5 Prime factorization of 25=5x5 Prime factorization of 50=2x5x5	(f) 45, 90, 95 $\begin{array}{r} 5 \overline{)45} \\ \underline{5} \\ 9 \\ \underline{3} \\ 3 \\ \underline{3} \\ 1 \end{array} \quad \begin{array}{r} 3 \overline{)90} \\ \underline{3} \\ 30 \\ \underline{3} \\ 10 \\ \underline{2} \\ 5 \\ \underline{5} \\ 1 \end{array} \quad \begin{array}{r} 5 \overline{)95} \\ \underline{5} \\ 19 \\ \underline{19} \\ 1 \end{array}$ Prime factorization of 45=5x3x3 Prime factorization of 90=3x3x2x5 Prime factorization of 95=5x19

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$50 = 5 \times 5 \times 2$ Product of common x non common prime factors $= 5 \times 2 \times 5 \times 2 = 100$ LCM = 100	Prime factorization of $95 = 5 \times 19$ Product of common x non common prime factors $= 5 \times 3 \times 3 \times 2 \times 19 = 1710$ LCM = 1710
(g) 32, 70, 80 $\begin{array}{r} 2 \overline{)32} \\ 2 \overline{)16} \\ 2 \overline{)8} \\ 2 \overline{)4} \\ 2 \overline{)2} \end{array} \quad \begin{array}{r} 2 \overline{)70} \\ 5 \overline{)35} \\ 7 \overline{)7} \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{)80} \\ 2 \overline{)40} \\ 2 \overline{)20} \\ 5 \overline{)10} \\ 2 \end{array}$ Prime factorization of $32 = 2 \times 2 \times 2 \times 2$ Prime factorization of $70 = 2 \times 5 \times 7$ Prime factorization of $80 = 2 \times 2 \times 2 \times 5 \times 2$ Product of common x non common prime factors $= 2 \times 2 \times 2 \times 5 \times 2 \times 7 \times 2 = 1120$ LCM = 1120	(h) 33, 66 $\begin{array}{r} 11 \overline{)33} \\ 3 \overline{)3} \\ 1 \end{array} \quad \begin{array}{r} 11 \overline{)66} \\ 2 \overline{)6} \\ 3 \end{array}$ Prime factorization of $33 = 11 \times 3$ Prime factorization of $66 = 11 \times 2 \times 3$ Product of common x non common prime factors $= 11 \times 2 \times 3 = 66$ LCM = 66

(Q5) Find the LCM of the following numbers using division.

(a) 4, 9 $\begin{array}{r} 2 \overline{)4,9} \\ 3 \overline{)2,9} \\ 2 \overline{)3} \end{array}$ LCM = $2 \times 3 \times 2 \times 3 = 36$	(b) 7, 11 $\begin{array}{r} 7 \overline{)7,11} \\ 11 \overline{)1,11} \\ 1 \overline{)1} \end{array}$ LCM = $7 \times 11 = 77$
(c) 14, 26 $\begin{array}{r} 2 \overline{)14,26} \\ 7 \overline{)7,13} \\ 13 \overline{)1,13} \\ 1 \overline{)1} \end{array}$ LCM = $2 \times 7 \times 13 = 182$	(d) 20, 40 $\begin{array}{r} 2 \overline{)20,40} \\ 2 \overline{)10,20} \\ 5 \overline{)5,10} \\ 1 \overline{)2} \end{array}$ LCM = $2 \times 2 \times 5 \times 2 = 40$

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(e) 6,24,42 $\begin{array}{r} 2 \overline{) 6, 24, 42} \\ 3 \overline{) 3, 12, 21} \\ 2 \overline{) 1, 4, 7} \\ 1, 2, 7 \end{array}$ LCM = $2 \times 3 \times 2 \times 2 \times 7 = 168$	(f) 10,20,30 $\begin{array}{r} 2 \overline{) 10, 20, 30} \\ 5 \overline{) 5, 10, 15} \\ 1, 2, 3 \end{array}$ LCM = $2 \times 5 \times 2 \times 3 = 60$
(g) 12,18,38 $\begin{array}{r} 2 \overline{) 12, 18, 38} \\ 3 \overline{) 6, 9, 19} \\ 2, 3, 19 \end{array}$ LCM = $2 \times 3 \times 2 \times 3 \times 19 = 684$	(h) 6,15,21 $\begin{array}{r} 2 \overline{) 6, 15, 21} \\ 3 \overline{) 3, 15, 21} \\ 1, 5, 7 \end{array}$ LCM = $2 \times 3 \times 5 \times 7 = 210$
6. 84 apples, 56 bananas and 21 oranges were distributed equally among some children. If the same combination of all kinds of fruits is distributed among all the children, find out the maximum possible number of children who can get the fruits?	
$\begin{array}{r} 7 \overline{) 84} \\ 3 \overline{) 12} \\ 2 \overline{) 4} \\ 2 \end{array}$ $\begin{array}{r} 7 \overline{) 56} \\ 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \end{array}$ $\begin{array}{r} 7 \overline{) 21} \\ 3 \overline{) 3} \\ 1 \end{array}$ Prime factorization of 84 = $7 \times 3 \times 2$ Prime factorization of 56 = $7 \times 2 \times 2 \times 2$ Prime factorization of 21 = $7 \times 3 \times 1$ Common prime factor = 7 HCF = 7 Kids	
7. Three water containers contain 12 liters, 24 liters and 42 liters of water. a) Find the maximum capacity of a measuring container that can fully measure the amount of water in all three containers. b) Find out how many times this container needs to be filled to empty each container.	

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$\begin{array}{r} 6 \overline{)12} \\ \underline{12} \\ 0 \end{array}$ $\begin{array}{r} 6 \overline{)24} \\ \underline{12} \\ 12 \\ \underline{12} \\ 0 \end{array}$ $\begin{array}{r} 6 \overline{)42} \\ \underline{12} \\ 30 \\ \underline{30} \\ 0 \end{array}$ Prime factorization of 12=6x2 Prime factorization of 24=6x2x2 Prime factorization of 42=6x7 Highest Common factor=6 HCF=6 Maximum capacity=6	(7b) Maximum capacity is=6 liter So 1st water container= $12 \div 6 = 2$ time 2nd water container=$24 \div 6 = 4$ 3rd water container=$42 \div 6 = 7$ $\begin{array}{r} 2 \\ \sqrt{12} \\ \underline{-12} \\ 0 \end{array}$ $\begin{array}{r} 4 \\ \sqrt{24} \\ \underline{-24} \\ 0 \end{array}$ $\begin{array}{r} 7 \\ \sqrt{42} \\ \underline{-42} \\ 0 \end{array}$
8. Find the smallest number that can be completely divided by 32 and 55 without leaving any remainder. $\begin{array}{r} 11 \overline{)32,55} \\ \underline{33} \\ 2 \\ \underline{22} \\ 0 \end{array}$ $\begin{array}{r} 2 \overline{)32,5} \\ \underline{32} \\ 5 \\ \underline{4} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)16,5} \\ \underline{16} \\ 5 \\ \underline{4} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)8,5} \\ \underline{8} \\ 5 \\ \underline{4} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)4,5} \\ \underline{4} \\ 5 \\ \underline{4} \\ 1 \end{array}$ $\begin{array}{r} 2 \overline{)2,5} \\ \underline{2} \\ 5 \\ \underline{4} \\ 1 \end{array}$ LCM= $11 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5$ = 1760	9. Find the least number of stickers which can be equally distributed among 15, 12 and 10 children. $\begin{array}{r} 5 \overline{)15,12,10} \\ \underline{15} \\ 0 \end{array}$ $\begin{array}{r} 3 \overline{)3,12,2} \\ \underline{3} \\ 0 \end{array}$ $\begin{array}{r} 2 \overline{)1,4,2} \\ \underline{1} \\ 0 \end{array}$ $\begin{array}{r} 1 \overline{)1,2,1} \\ \underline{1} \\ 0 \end{array}$ LCM = $5 \times 3 \times 2 \times 2 = 60$ sticks

