EXERCISE 8 (C)

1.(i) 8, 12 and 24

M_8 = 8, 16, 24, 32, 40, 48, 56, 64, 72, 80 ...
M_{12} = 12, 24, 36, 48, 60, 72, 84, 96, 108, 120 ....
M_{24} = 24, 48, 72, 96, 120, 144, 168 .....

Common multiples of 8, 12 and 24 is 72

So, LCM of 8, 12 and 24 = 72

(ii) 10, 15, 20

M_{10} = 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 ...
M_{15} = 15, 30, 45, 60, 75, 90, 105, 120, 135 and 150.
M_{20} = 20, 40, 60, 80, 100, 120, 140, 160, 180, 200.

Common multiple of 10, 15 and 20 is 60

So, LCM of 10, 15 and 20 = 60

(iii) 3, 6, 9 and 12.

$M_3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36.$
$M_6 = 6, 12, 18, 24, 30, 36, 42, 48, 54, 60.$
$M_9 = 9, 18, 27, 36, 45, 54, 63, 72, 81, 90$
$M_{12} = 12, 24, 36, 48, 60, 72, 84, 96, 108, 120.$

Common multiple of 3, 6, 9 and 12 = 36.
LCM of 3, 6, 9 and 12 is 36.

2. (i) 18, 24 and 96

COMMON DIVISION METHOD

(i) →

$$\begin{array}{r|l} 2 & 18, 24, 96 \\ 3 & 9, 12, 48 \\ 2 & 3, 4, 16 \\ 2 & 3, 2, 8 \\ & 3, 1, 4 \end{array}$$

LCM of 18, 24, 96 = $2 \times 3 \times 2 \times 2 \times 3 \times 4 \times 1$
$= 288$

PRIME ~~COMMON~~ FACTOR ~~MULTIPLE~~ METHOD

(ii) → $18 = 2 \times 3 \times 3 = 2^1 \times 3^2$
$24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3^1$
$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 2^5 \times 3^1$

LCM required $= 2^5 \times 3^2$
$= 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$
$= 288$

(ii) 100, 150 and 200

COMMON DIVISION METHOD

(a) →

$$\begin{array}{r|l} 2 & 100, 150, 200 \\ 5 & 50, 75, 100 \\ 5 & 10, 15, 20 \\ 2 & 2, 3, 4 \\ & 1, 3, 2 \end{array}$$

LCM of 100, 150 and 200 = $2 \times 5 \times 5 \times 2 \times 3 \times 2 \times 1$

$= 600$

PRIME FACTOR METHOD

(b) → $100 = 2 \times 5 \times 2 \times 5 = 2^2 \times 5^2$

$150 = 2 \times 3 \times 5 \times 5 = 2^1 \times 3^1 \times 5^2$

$200 = 2 \times 2 \times 2 \times 5 \times 5 = 2^3 \times 5^2$

LCM required $= 2^3 \times 5^2 \times 3^1$

$= 2 \times 2 \times 2 \times 5 \times 5 \times 3$

$= 600.$

(iii) 14, 21 and 98

PRIME FACTOR METHOD

(b) → $14 = 2 \times 7 = 2^1 \times 7^1$

$21 = 3 \times 7 = 3^1 \times 7^1$

$98 = 2 \times 7 \times 7 = 2^1 \times 7^2$

LCM required $= 2^1 \times 3^1 \times 7^2$

$= 2 \times 3 \times 7 \times 7$

$= 294$

COMMON DIVISION METHOD

(a) →

$$\begin{array}{r|l} 7 & 14, 21, 98 \\ 2 & 2, 3, 14 \\ & 1, 3, 7 \end{array}$$

LCM of 14, 21 and 98 is $7 \times 2 \times 1 \times 3 \times 7$

$= 294$

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(iv) 22, 121 and 33

COMMON DIVISION METHOD

$$\begin{array}{r|l} 11 & 22,\ 121,\ 33 \\ \hline & 2,\ 11,\ 3 \end{array}$$

LCM of 22, 121 and 33 is $11 \times 11 \times 2 \times 3 = 726$.

PRIME FACTOR METHOD

$22 = 2 \times 11 = 2^1 \times 11^1$
$33 = 3 \times 11 = 3^1 \times 11^1$
$121 = 11 \times 11 = 11^2$

Required LCM $= 11^2 \times 2^1 \times 3^1$
$= 11 \times 11 \times 2 \times 3$
$= 726$

(v) 34, 85 and 51

COMMON DIVISION METHOD

$$\begin{array}{r|l} 17 & 34,\ 85 \text{ and } 51 \\ \hline & 2,\ 5,\ 3 \end{array}$$

LCM of 34, 85 and 51
$= 17 \times 2 \times 5 \times 3 = 510$

PRIME FACTOR METHOD

$34 = 2 \times 17 = 2^1 \times 17^1$
$85 = 5 \times 17 = 5^1 \times 17^1$
$51 = 3 \times 17 = 3^1 \times 17^1$

LCM Required $= 17^1 \times 5^1 \times 2^1 \times 3^1$
$= \cancel{510}\ 17 \times 5 \times 2 \times 3$
$= 510$

3. HCF of two no:s = 50
LCM of " " = 300
One no. = 150

Product of HCF and LCM = Product of two number

$\Rightarrow$ ~~Other no.~~ $\frac{\text{LCM} \times \text{HCF}}{\text{One Number}}$ = The other number

$$\begin{array}{r} 300 \\ \times\ 50 \\ \hline 000 \\ 15000 \\ \hline 15000 \end{array}$$

$$\begin{array}{r|l} & 100 \\ \hline 150 & 15000 \\ & -150 \\ \hline & 00 \\ & -0 \\ \hline & 00 \\ & -0 \\ \hline & 0 \end{array}$$

So, the other number is 100.

4. The product of two no:s = 432
LCM = 72
HCF = 432 ÷ 72 = $\frac{\text{the product of two nos.}}{\text{LCM}}$

= 432 ÷ 72 = 6

$$\begin{array}{r|l} & 6 \\ \hline 72 & 432 \\ & -432 \\ \hline & 00 \end{array}$$

So, the HCF of two numbers = 6

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5. The product of two numbers 19,200
HCF = 40
LCM = $\frac{\text{the product of two nos.}}{\text{HCF}}$
= 19,200 ÷ 40

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40 | 19200 | 480
     160
     ----
      320
     -320
     ----
       00
      - 0
     ----
       00
```

so, the LCM of two nos. is 480.

~~6.~~

~~3 | 12, 15, 18, 24, 36~~
~~2 | 4, 5, 6, 8, 12~~
~~2 | 2, 5, 3, 4, 6~~
~~1, 5, 3, 2, 3~~

6. 3 | 12, 15, 18, 24, 36
2 | 4, 5, 6, 8, 12
2 | 2, 5, 3, 4, 6
1, 5, 3, 2, 3

$3 \times 2 \times 2 \times 1 \times 5 \times 3 \times 2 \times 3 = 1080$

The smallest number, which when divided by 12, 15, 18, 24 and 36, is 1080.

7.

$$\begin{array}{r|l}
2 & 12, 18, 24, 32 \text{ and } 40 \\ \hline
2 & 6, 9, 12, 16, 20 \\ \hline
2 & 3, 9, 6, 8, 10 \\ \hline
2 & 3, 9, 3, 4, 5 \\ \hline
3 & 3, 9, 3, 2, 5 \\ \hline
 & 1, 3, 1, 2, 5
\end{array}$$

$2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 1440$

Required number $= 1440 - 1 = 1439$

→ So, the smallest number which, when increased by one is exactly divisible by 12, 18, 24, 32 and 40 is 1439

8.

$$\begin{array}{r|l}
2 & 18, 36, 32, 27 \\ \hline
3 & 9, 18, 16, 27 \\ \hline
3 & 3, 6, 16, 9 \\ \hline
2 & 1, 3, 16, 3 \\ \hline
2 & 1, 3, 8, 3 \\ \hline
2 & 1, 3, 4, 3 \\ \hline
 & 1, 3, 2, 3
\end{array}$$

$2 \times 3 \times 3 \times 2 \times 2 \times 2 \times 3 \times 2 \times 3 = 2592$

Required number $= 2592 + 3 = 2595$

→ So the smallest number which, ~~when~~ on being decreased by 3 is completely divisible by 18, 36, 32 and 27 is 2595.