

Exercise 2.10

Q.1 what is the smallest number which when divided by 24, 36 and 54 gives a remainder of 5 each time?

Solution, we know that the smallest number divisible by 24, 36, 54 is LCM (24, 36, 54)

$$\begin{aligned} \therefore \text{LCM} &= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \\ &= 216 \end{aligned}$$

$$\begin{aligned} \text{hence, required number} \\ &= 216 + 5 \\ &= 221 \end{aligned}$$

2	24, 36, 54
2	12, 18, 27
2	6, 9, 27
3	3, 9, 27
3	1, 3, 9
	1, 1, 3

Q.2 what is the smallest number that both 33 and 39 divide leaving remainders of 5?

Solution

A number divisible by 33 and 39 is their LCM

$$\begin{aligned} \therefore \text{LCM} &= 3 \times 11 \times 13 \\ &= 429 \end{aligned}$$

$$\begin{aligned} \text{here required number} &= 429 + 5 \\ &= 434 \end{aligned}$$

3	33, 39
	11, 13

Q.3 Find the least number that is divisible by all the natural number between 1 and 10 (both inclusive)

Solution: Least number divisible by numbers between 1 and 10 is their LCM.

By Prime factorisation, 2, 3, 5, 7 are Prime nos. so

$$4 = 2 \times 2$$

$$6 = 2 \times 3$$

$$8 = 2 \times 2 \times 2$$

$$9 = 3 \times 3$$

$$10 = 2 \times 5$$

$$\therefore \text{LCM}(1 \text{ to } 10) = 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7 \\ = 2520$$

hence 2520 is the required number.

Q.4 what is the smallest number that is divisible when divided by 35, 56 and 91 leaving remainder of 7 in each case.

Solution: Smallest number divisible by 35, 56, 91 is their LCM

$$\text{LCM} = 2 \times 2 \times 2 \times 7 \times 5 \times 13 \\ = 3640$$

$$\therefore \text{Required number} = 3640 + 7 \\ = 3647$$

2	35, 56, 91
2	35, 28, 91
2	35, 14, 91
7	35, 7, 91
	5, 1, 13

Q.5 In a school, there are two sections - section A and section B of class V. There are 32 students in section A and 36 in section B. Find the minimum number of books required for their library so that they can be distributed equally among students of section A or section B.

Solution! Minimum number of books required
 $= \text{LCM}(32, 36)$

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

$$= 288 \text{ Books.}$$

2	32, 36
2	16, 18
2	8, 9
2	4, 9
2	2, 9
3	1, 9
	1, 3

Q.6 In a morning walk three persons step off together. Their steps measures 80cm, 85cm and 90cm respectively. What is the minimum distance each should walk so that he can cover the distance in complete steps?

Solution!

$$\text{Minimum Distance} = \text{LCM}(80, 85, 90)$$

$$= 2 \times 5 \times 2 \times 2 \times 2 \times 3 \times 17 \times 3$$

$$= 12240 \text{ cm}$$

$$= 122 \text{ m } 40 \text{ cm}$$

2	80, 85, 90
5	40, 85, 45
2	8, 17, 9
2	4, 17, 9
2	2, 17, 9
3	1, 17, 9
	1, 17, 3

Q.7 Determine the number nearest to 100000 but greater than 100000 which is exactly divisible by each of 8, 15 and 21.

Solution: First we find LCM (8, 15, 21)

$$\begin{aligned} \text{LCM} &= 2 \times 2 \times 2 \times 3 \times 5 \times 7 \\ &= 840 \end{aligned}$$

$$\begin{array}{r|l} 2 & 8, 15, 21 \\ \hline 2 & 4, 15, 21 \\ \hline 2 & 2, 15, 21 \\ \hline 3 & 1, 15, 21 \\ \hline & 1, 5, 7 \end{array}$$

Now that number should be divisible by 840. so

$$\begin{array}{r} 119 \\ 840 \overline{) 100000} \\ \underline{-840} \\ 1600 \\ \underline{-840} \\ 7600 \\ \underline{-7560} \\ 40 \end{array}$$

here remainder is 40.

$$\begin{aligned} \text{So, required number} &= 100000 + (840 - 40) \\ &= 100000 + 800 \\ &= 100800 \end{aligned}$$

Q8 A school bus picking up children in a colony of flats stops at every six blocks of flats. Another school bus starting from the same place stops at every eight blocks of flats, which is the first bus stop at which both of them will stop.

Solution:

The first bus stop at which both of them stop

$$\begin{aligned}
 &= \text{LCM}(6, 8) \\
 &= 2 \times 2 \times 2 \times 3 \\
 &= 24^{\text{th}} \text{ Block}
 \end{aligned}$$

$$\begin{array}{r|l}
 2 & 6, 8 \\
 \hline
 2 & 3, 4 \\
 \hline
 & 3, 2
 \end{array}$$

$\therefore$ Bus will stop at 24th Block.

Q.9 Telegraph poles occur at equal distances of 220 m along a road and heaps of stones are put at equal distances of 300 m along the same road. The first heap is at the foot of the first pole. How far from it along the road is the next heap which lies at the foot of a pole.

Solution: Distance of next heap = $\text{LCM}(220, 300)$

$$\begin{aligned}
 &= 2 \times 2 \times 5 \times 5 \times 3 \times 11 \\
 &= 3300 \text{ m}
 \end{aligned}$$

$$\begin{array}{r|l}
 2 & 220, 300 \\
 \hline
 2 & 110, 150 \\
 \hline
 5 & 55, 75 \\
 \hline
 5 & 11, 15 \\
 \hline
 & 11, 3
 \end{array}$$

Q.10 Find the smallest number which leaves remainders of 8 and 12 when divided by 28 and 32 respectively.

Sol: $\text{LCM}(28, 32) = 2 \times 2 \times 2 \times 2 \times 2 \times 7$
 $= 224$

Remainders are 8 and 12, so

$$28 - 8 = 20, \quad 32 - 12 = 20$$

$$\therefore \text{required number} = 224 - 20 = 204$$

$$\begin{array}{r|l}
 2 & 28, 32 \\
 \hline
 2 & 14, 16 \\
 \hline
 2 & 7, 8 \\
 \hline
 2 & 7, 4 \\
 \hline
 2 & 7, 2 \\
 \hline
 & 7, 1
 \end{array}$$