Exercise 13

1. The greatest number which will exactly divide 840 and 2296 is the HCF of the given numbers.

$$\begin{array}{r|l} 2 & 840 \\ 2 & 420 \\ 2 & 210 \\ 3 & 105 \\ 5 & 35 \\ & 7 \end{array} \qquad \begin{array}{r|l} 2 & 2296 \\ 2 & 1148 \\ 2 & 574 \\ 7 & 287 \\ & 41 \end{array}$$

$\therefore$ HCF $= 2 \times 2 \times 2 \times 7 = 56$

2. The greatest number which will exactly divide each of 90, 108 and 126 without leaving a remainder is the HCF of the given numbers.

$$\begin{array}{r|l} 2 & 90 \\ 3 & 45 \\ 3 & 15 \\ & 5 \end{array} \qquad \begin{array}{r|l} 2 & 108 \\ 2 & 54 \\ 3 & 27 \\ 3 & 9 \\ & 3 \end{array} \qquad \begin{array}{r|l} 2 & 126 \\ 3 & 63 \\ 3 & 21 \\ & 7 \end{array}$$

$\therefore$ HCF $= 2 \times 3 \times 3 = 18$

3. The smallest number, which can be exactly divided by 72 and 108 is the LCM of the given numbers.

$$\begin{array}{r|l} 2 & 72, 108 \\ 2 & 36, 54 \\ 3 & 18, 27 \\ 3 & 6, 9 \\ & 2, 3 \end{array}$$

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

$= 216$

4. The smallest number ~~which of five digits~~ that can be exactly divided by 60, 90 and 80 is the LCM of the given numbers.

$$\begin{array}{r|l} 2 & 60, 90, 80 \\ 5 & 30, 45, 40 \\ & 6, 9, 8 \end{array}$$

$LCM = 2 \times 5 \times 6 \times 9 \times 8$

$= 4320$

5. ~~The greatest number that~~

5. The greatest number that can be exactly divided by 75, 45 and 60 is the HCF of the given number.

$$\begin{array}{r|l} 3 & 75 \\ 5 & 25 \\ & 5 \end{array} \qquad \begin{array}{r|l} 3 & 45 \\ 5 & 15 \\ & 3 \end{array} \qquad \begin{array}{r|l} 3 & 60 \\ 5 & 20 \\ & 4 \end{array}$$

$HCF = 3 \times 5 = 15$

6. The greatest number that will divide 517 and 815 leaving the remainders 1 and 3 respectively is the HCF of $(517-1) = 516$ and $(815-3) = 812$.

$$\begin{array}{r|l} 2 & 516 \\ 2 & 258 \\ 3 & 129 \\ & 43 \end{array} \qquad \begin{array}{r|l} 2 & 812 \\ 2 & 406 \\ 7 & 203 \\ & 29 \end{array}$$

$HCF = 2 \times 2 = 4$

7. The greatest number that will divide 37, 56, 93 leaving the remainders 1, 2 and 3 respectively is the HCF of $(37-1)=36$, $(56-2)=54$ and $(93-3)=90$.

2 | 36	2 | 54	2 | 90
2 | 18	3 | 27	3 | 45
3 | 9	3 | 9	3 | 15
3	3	5

HCF = $2 \times 3 \times 3 = 18$

8. The greatest number that will divide 137, 187, 422 leaving the remainders 2 in each case is the HCF of $(137-2)=135$, $(187-2)=185$ and $(422-2)=420$.

5 | 135	5 | 185	5 | 420
3 | 27	37	5 | 85
3 | 9		17
3		

HCF = 5

9. The smallest number that ~~with~~ divided by 6, 8, 12, 15 and 20 leaves the same remainder 5. is the LCM of $\{6, 8, 12, 15, 20\} + 5$

LCM = $(2 \times 2 \times 2 \times 3 \times 5) + 5$

$= 120 + 5 = 125$

2 |	6, 8, 12, 15, 20
2 |	3, 4, 6, 15, 10
2 |	3, 2, 3, 15, 5
3 |	3, 1, 3, 15, 5
5 |	1, 1, 1, 5, 5
	1, 1, 1, 1, 1

10. The greatest number of six digits ~~which~~ that is exactly divisible by 27, 45, 60, 72 and 96

11. The smallest possible number of blocks in the heap is,

(LCM of 28, 32, 42) + 5

= (2×2×2×2×2×3×7) + 5

= 672 + 5

= 677

2	28, 32, 42
2	14, 16, 21
2	7, 8, 21
2	7, 4, 21
2	7, 2, 21
7	7, 1, 21
3	1, 1, 3
	1, 1, 1

12. The smallest possible number of students in the class is,

(LCM of 4, 6, 11) + 3

= (2×2×3×11) + 3

= 132 + 3 = 135

2	4, 6, 11
2	2, 3, 11
3	1, 3, 11
11	1, 1, 11
	1, 1, 1

13. Four bells ring at intervals of 2, 5, 8 and 10 seconds respectively.

∴ They will ring together again after,

(LCM of 2, 5, 8, 10)

= 2×2×2×5 = 40 seconds

2	2, 5, 8, 10
2	1, 5, 4, 5
2	1, 5, 2, 5
5	1, 5, 1, 5
	1, 1, 1, 1

14. Three lions roar regularly at the intervals of 10, 15, and 12 minutes respectively.

∴ They roar together again after,

(LCM of 10, 15, 12)

= 2×2×3×5 = 60 minutes

= 1 hr.

2	10, 15, 12
2	5, 15, 6
3	5, 15, 3
5	5, 5, 1
	1, 1, 1

∴ Required time = 10 am + 1 hr

= 11 am

∴ They roar together again at 11 am.