

Exercise 1.4

Q.1 (iv) 404 and 96

$$\begin{array}{r|l} 2 & 404 \\ \hline 2 & 202 \\ \hline 101 & 101 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 96 \\ \hline 2 & 48 \\ \hline 2 & 24 \\ \hline 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

Q1(iv)

$$404 = 2 \times 2 \times 101$$

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$\text{HCF} = 2 \times 2$$

$$= \boxed{4}$$

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 101$$

$$= \boxed{9696}$$

$$\text{LCM} \times \text{HCF} = \text{Product of no.}$$

$$9696 \times 4 = 404 \times 96$$

$$\boxed{38784 = 38784}$$

Hence, verified.

Q2(v) 40, 36 and 126

$$\begin{array}{r|l} 2 & 40 \\ 2 & 20 \\ 2 & 10 \\ 5 & 5 \\ & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 36 \\ 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 126 \\ 3 & 63 \\ 3 & 21 \\ 7 & 7 \\ & 1 \end{array}$$

$$40 = 2 \times 2 \times 2 \times 5$$

$$36 = 2 \times 2 \times 3 \times 3$$

$$126 = 2 \times 3 \times 3 \times 7$$

$$\text{HCF} = \boxed{2}$$

$$\text{LCM} = 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7$$

$$= \boxed{2520}$$

Q3(v) 84, 90 and 120

Q2(v)

$$\begin{array}{r|l}
 2 & 84 \\
 2 & 42 \\
 3 & 21 \\
 7 & 7 \\
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 90 \\
 3 & 45 \\
 3 & 15 \\
 5 & 5 \\
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 120 \\
 2 & 60 \\
 2 & 30 \\
 3 & 15 \\
 5 & 5 \\
 & 1
 \end{array}$$

$$84 = 2^2 \times 3 \times 7$$

$$90 = 2 \times 3^2 \times 5$$

$$120 = 2^3 \times 3 \times 5$$

$$\begin{aligned}
 \text{HCF} &= 2 \times 3 \\
 &= \boxed{6}
 \end{aligned}$$

$$\begin{aligned}
 \text{LCM} &= 2^3 \times 3^2 \times 5 \times 7 \\
 &= \boxed{2520}
 \end{aligned}$$

(vi) 24, 15 and 36

$$\begin{array}{r|l}
 2 & 24 \\
 2 & 12 \\
 2 & 6 \\
 3 & 3 \\
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 3 & 15 \\
 5 & 5 \\
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 36 \\
 2 & 18 \\
 3 & 9 \\
 3 & 3 \\
 & 1
 \end{array}$$

$$24 = 2^3 \times 3$$

$$15 = 3 \times 5$$

$$36 = 2^2 \times 3^2$$

$$\text{HCF} = \boxed{3}$$

$$\begin{aligned}
 \text{LCM} &= 2^3 \times 3^2 \times 5 \\
 &= \boxed{360}
 \end{aligned}$$

Q.3(ii) 306 and 657

Smallest no. divisible by both no. = LCM (306, 657)

$$\begin{array}{r|l}
 2 & 306, 657 \\
 \hline
 3 & 153, 657 \\
 \hline
 3 & 51, 219 \\
 \hline
 17 & 17, 73 \\
 \hline
 73 & 1, 73 \\
 \hline
 & 1, 1
 \end{array}$$

$$\begin{aligned}
 \text{LCM} &= 2 \times 3 \times 3 \times 17 \times 73 \\
 &= \boxed{22338}
 \end{aligned}$$

$\therefore$ The smallest no. is 22338.

Q.4

$$\text{HCF} = 16$$

$$\text{LCM} = 380$$

$$\begin{array}{r}
 16 \overline{) 380} \quad 23 \\
 \underline{- 32} \\
 60 \\
 \underline{- 48} \\
 12
 \end{array}$$

Since, LCM is not fully divisible by HCF,
 $\therefore$ We cannot have 2 no. having 16 as HCF and 380 as LCM.

Q.5

$$\text{HCF} = 145$$

$$\text{LCM} = 2175$$

Q.5HCF $\times$ LCM = Product of no.

$$145 \times 2175 = 725 \times x$$

$$x = \frac{145 \times 2175}{725}$$

$$x = 435$$

Q.6HCF $\times$ LCM = Product of no.

$$16 \times \text{LCM} = 3072$$

$$\text{LCM} = \frac{3072}{16}$$

$$\text{LCM} = 192$$

Q.7HCF $\times$ LCM = Product of no.

$$6 \times 180 = 30 \times x$$

$$x = \frac{6 \times 180}{30}$$

$$x = 36$$

Q.8

520 and 468

2	468, 520
2	234, 260
2	117, 130
3	117, 65
3	39, 65
5	13, 65
13	13, 13
	1, 1

$$\text{LCM} = 2^3 \times 3^2 \times 5 \times 13$$

$$= 4680$$

Q8

$$\begin{aligned}\text{Required no.} &= 4680 - 17 \\ &= \boxed{4663}\end{aligned}$$

$\therefore$ The smallest no. which when increased 17 is exactly divisible by both 520 and 468 is 4663.

Q9 28 and 32

2	28, 32
2	14, 16
2	7, 8
2	7, 4
2	7, 2
7	7, 1
	1, 1

$$\begin{aligned}\text{LCM} &= 2^5 \times 7 \\ &= 224\end{aligned}$$

$$\begin{aligned}\text{Required no.} &= 224 - (8 + 12) \\ &= 224 - 20 \\ &= \boxed{204}\end{aligned}$$

$\therefore$ The smallest no. which leaves remainders 8 and 12 when divided by 28 and 32 is 204.

Q10 35, 56 and 91

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

7	7, 7, 91
13	1, 1, 13
	1, 1, 1

Q10

$$\text{LCM} = 2^3 \times 5 \times 7 \times 13$$

$$= 3640$$

$$\text{Required no.} = 3640 + 7$$

$$= \boxed{3647}$$

$\therefore$ The smallest no. which when divided by 35, 56 and 91 leaves remainders of 7 is 3647,

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Real NumbersEx 1.4

$$\text{Length of courtyard} = 18 \text{ m } 72 \text{ cm} \\ = 1872 \text{ cm}$$

$$\text{Breadth of courtyard} = 13 \text{ m } 20 \text{ cm} \\ = 1320 \text{ cm}$$

$$\text{Size of tile} = \text{HCF}(1872, 1320) = 24 \text{ cm}$$

$$1320 \overline{) 1872} (1$$

$$- 1320$$

$$552 \overline{) 1320} (2$$

$$- 1104$$

$$216 \overline{) 552} (2$$

By EDL,

$$1872 = 1320 \times 1 + 552$$

$$1320 = 552 \times 2 + 216$$

$$552 = 216 \times 2 + 120$$

$$216 = 120 \times 1 + 96$$

$$120 = 96 \times 1 + 24$$

$$96 = 24 \times 4 + 0$$

$$\text{HCF} = \boxed{24}$$

$$432 \overline{) 216} (1$$

$$- 120$$

$$96 \overline{) 120} (1$$

$$- 96$$

$$24 \overline{) 96} (4$$

$$- 96$$

$$0$$

$$\text{No. of tiles required} = \frac{\text{Area of courtyard}}{\text{Area of tile}}$$

$$= \frac{1872 \times 1320}{24 \times 24}$$

$$= \boxed{4290}$$

$$\text{greatest 6-digit no.} = 999999$$

$$\text{greatest 6-digit no. divisible by } 24, 15, 36$$

Q.12

$$= 999999 - \text{Remainder when } 999999 \div \text{LCM of } (24, 15, 36)$$

2	24, 15, 36
2	12, 15, 18
2	6, 15, 9
3	3, 15, 3
3	1, 5, 1
5	1, 5, 1
	1, 1, 1

$$\text{LCM} = 2 \times 2 \times 2 \times 3 \times 3 \times 5$$

$$= \boxed{360}$$

$$360 \overline{) 999999} \quad (2777$$

$$\underline{- 720}$$

$$2799$$

$$\underline{- 2520}$$

$$2799$$

$$\underline{- 2520}$$

$$2799$$

$$\underline{- 2520}$$

$$279$$

$$\text{greatest no.} = 999999 - 279$$

$$= \boxed{999720}$$

$$\text{Q.13 LCM of 8, 15, 21}$$

Q13

2	8, 15, 21
2	4, 15, 21
2	2, 15, 21
3	1, 15, 21
5	1, 5, 7
7	1, 1, 7
	1, 1, 1

$$\text{LCM} = 2^3 \times 3 \times 5 \times 7$$

$$= 840$$

$$\begin{array}{r} 840 \overline{) 110000} \quad (13 \\ - 840 \\ \hline 2600 \\ - 2520 \\ \hline 800 \end{array}$$

$$\text{Required greatest no.} = 110000 - 800$$

$$= \boxed{109200}$$

$\therefore 109200$ is the nearest no. to 110000 & greater than 100000 which is exactly divisible by 8, 15, 21.

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classmate

Date

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Q.14 Numbers = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
 Least no. that is divisible by all no. = LCM (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)

~~2 1, 2, 3, 4, 5, 6, 7, 8, 9, 10~~
~~2 1, 1, 3, 2, 3, 3, 7, 4, 9, 5~~
~~2 1, 1, 3, 1, 5, 3, 7, 2, 9, 5~~

1 = 1

6 = 2 × 3

2 = 2

7 = 7

3 = 3

8 = 2 × 2 × 2

4 = 2 × 2

9 = 3 × 3

5 = 5

10 = 2 × 5

$$\text{LCM} = 2^3 \times 3^2 \times 5 \times 7$$

$$= \boxed{2520}$$

∴ 2520 is the least no. that is divisible by all the numbers between 1 & 10 (both inclusive).

Q.15 Circumference of field = 360 km

$$\text{No. of days taken by 1st cyclist} = \frac{360}{48} \times 7.5$$

$$= 7.5 \text{ days}$$

$$= 180 \text{ hrs.}$$

$$\text{No. of days taken by 2nd cyclist} = \frac{360}{60} \times 6$$

$$= 6 \text{ days}$$

Q15

$$= 144 \text{ hrs}$$

$$\text{No. of days taken by 3rd cyclist} = \frac{360}{72} \times 5$$

$$= 5 \text{ days}$$

$$= 120 \text{ hrs.}$$

Hours after which they will meet together = LCM (180, 144, 120)

2	180, 144, 120
2	90, 72, 60
2	45, 36, 30
2	45, 18, 15
3	45, 9, 15
3	15, 3, 5
5	5, 1, 5
	1, 1, 1

$$\text{LCM} = 2^4 \times 3^2 \times 5$$

$$= 720 \text{ hrs}$$

$$= \frac{720}{24} \times 30$$

$$= \boxed{30 \text{ days}}$$

$\therefore$ They will again meet after 30 days.

Step of 1st person = 80 cm

Step of 2nd person = 85 cm

Step of 3rd person = 90 cm

Least distance each should walk = LCM (80, 85, 90)

2	80, 85, 90
2	40, 85, 45

Q.16

2	20, 85, 45
2	10, 85, 45
3	5, 85, 45
3	5, 85, 15
5	5, 85, 5
17	1, 17, 1
	1, 1, 1

$$\text{LCM} = 2^4 \times 3^2 \times 5 \times 17$$

$$= 12240 \text{ cm}$$

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

$\therefore 122 \text{ m } 40 \text{ cm}$ is the least distance each should walk.

Q.17 Step of 1st person = 30 cm
Step of 2nd person = 36 cm
Step of 3rd person = 40 cm

Least distance each should walk = LCM (30, 36, 40)

2	30, 36, 40
2	15, 18, 20
2	15, 9, 10
3	15, 9, 5
3	5, 3, 5
5	5, 1, 5
	1, 1, 1

$$\text{LCM} = 2^3 \times 3^2 \times 5$$

$$= \boxed{360 \text{ cm}}$$

$\therefore 360 \text{ cm}$ is the least distance each should walk.

Numbers = 1251, 9377 and 15628

Remainders = 1, 2, 3

$\therefore$ 1250, 9375 and 15625 are completely divisible by the required no.

$\therefore$ The required no. is HCF of 1250, 9375 & 15625.

$$1250 \overline{) 9375} (7$$

$$- 8750$$

$$625 \overline{) 1250} (2$$

$$- 1250$$

$$0$$

By EDL,

$$9375 = 1250 \times 7 + 625$$

$$1250 = 625 \times 2 + 0$$

$$\therefore \text{HCF} = 625$$

$$625 \overline{) 15625} (25$$

$$- 1250$$

$$3125$$

$$- 3125$$

$$0$$

$\therefore$ By EDL,

$$15625 = 625 \times 25 + 0$$

$$\therefore \text{HCF} = \underline{625}$$

$\therefore$ The required no. is 625.