Exercise 2.8

Q1 Find the largest number which divides 615 and 963 leaving remainder 6 in each case.

Solution: Since $615 - 6 = 609$

$963 - 6 = 957$

$\therefore$ required number = HCF (609, 957)

$$
\begin{array}{r|l}
609 & 957 \;(1 \\
 & -609 \\
\hline
348 & 609 \;(1 \\
 & -348 \\
\hline
261 & 348 \;(1 \\
 & -261 \\
\hline
87 & 261 \;(3 \\
 & -261 \\
\hline
 & 0
\end{array}
$$

$\therefore$ last divisor is 87.

Hence required number = 87.

Q.2 Find the greatest number which divides 285 and 1249 leaving remainders 9 and 7 respectively.

Solution: greatest numbe is HCF of (285−9) and (1249−7)

$\Rightarrow$ HCF (276, 1242)

Now

$$276 \overline{)1242} (4$$
$$-1104$$
$$\overline{138)276(2}$$
$$-276$$
$$\overline{0}$$

∵ last divisor is 138

hence greatest number = 138

Q3 What is the largest number that divides 626, 3127 and 15628 and leaves a remainders of 1, 2 and 3 respectively.

Sol: ∵ $626 - 1 = 625$

$3127 - 2 = 3125$

$15628 - 3 = 15625$

∴ required number = HCF (625, 3125, 15625)

5	625
5	125
5	25
5	5
	1

5	3125
5	625
5	125
5	25
5	5
	1

5	15625
5	3125
5	625
5	125
5	25
5	5
	1

∵ $625 = 5 \times 5 \times 5 \times 5$

$3125 = 5 \times 5 \times 5 \times 5 \times 5$

$15625 = 5 \times 5 \times 5 \times 5 \times 5 \times 5$

hence HCF = $5 \times 5 \times 5 \times 5 = 625$

so, required number = 625

Q.4 The length, breadth and height of a room are 8m 25cm, 6m 75cm and 4m 50 cm respectively. Determine the longest rod which can measure the three dimensions of the room exactly.

Solution Dimensions of room are

length = 8m 25cm = 825 cm

breadth = 6m 75cm = 675 cm

height = 4m 50 cm = 450 cm

length of longest rod = HCF (825, 675, 450)

5	825
5	165
3	33
11	11
	1

5	675
5	135
3	27
3	9
3	3
	1

2	450
3	225
3	75
5	25
5	5
	1

$825 = 5 \times 5 \times 3 \times 11$

$675 = 5 \times 5 \times 3 \times 3 \times 3$

$450 = 2 \times 3 \times 3 \times 5 \times 5$

$\therefore$ HCF $= 3 \times 5 \times 5 = 75$ cm.

Q.5 A rectangular courtyard 20m 16cm long and 15m 60cm broad. It is to be paved with square stones of the same size. Find the least possible number of such stones.

Solution: length of courtyard = 20m 16cm = 2016 cm
breadth = 15m 60cm = 1560 cm

least possible side of square stone = HCF (2016, 1560)
By Prime factorisation

$2016 = 2\times2\times2\times2\times2\times3\times3\times7$

$1560 = 2\times2\times2\times3\times5\times13$

Thus, HCF $= 2\times2\times2\times3 = 24$ cm.

Now, Number of stones used $= \frac{\text{Area of courtyard}}{\text{Area of one stone}}$

$= \frac{2016\times1560}{24\times24} = 5460$ stones.

Hence, 5460 squared stones required.

Q.6 Determine the longest tape which can be used to measure exactly the lengths 7m, 3m 85cm and 12m 95cm.

Solution: 7m = 700 cm

3m 85 cm = 385 cm

12m 95 cm = 1295 cm

length of longest tape = HCF (700, 385, 1295

$\therefore$ $700 = 2\times2\times5\times5\times7$

$385 = 5\times7\times11$

$1295 = 5\times7\times37$

Therefore, the HCF = $5 \times 7 = 35$

Thus length of tape = 35 cm.

Q.7 105 goats, 140 donkeys and 175 cows have to be taken across a river. There is only one boat which will have to make many trips in order to do so. The lazy boatman has his own conditions for transporting them. He insists that he will make the same number of animals in every trip and they have to be of the same kind. He will naturally like to take the largest possible number each time. Can you tell how many animals went in each trip?

Solution

- Number of animals went in each trip
  = HCF (105, 140, 175)

Now $105 = 3 \times 5 \times 7$

$140 = 2 \times 2 \times 5 \times 7$

$175 = 5 \times 5 \times 7$

$\therefore$ HCF $= 5 \times 7 = 35$

$\therefore$ Therefore 35 animals went in each trip.

Q.8 Two brands of chocolate are available in packs of 24 and 15 respectively. If I need to buy an equal number of chocolates of both kinds, what is the least number of boxes of each kind I would need to buy?

Solution: It there are two boxes A and B containing 15 and 24 chocolates respectively

Least number of chocolates = LCM (15, 24)

3	15, 24
2	5, 8
2	5, 4
2	5, 2
5	5, 1
	1, 1

$\therefore$ LCM = $3 \times 2 \times 2 \times 2 \times 5$

= 120 Chocolates.

Now,

Number of boxes of brand A = $120 \div 15 = 8$ Boxes

Number of boxes of brand B = $120 \div 24 = 5$ boxes.

Q.9 During a sale, colour pencils were being sold in packs of 24 each and crayons in packs of 32 each. If you want full packs of both and the same number of pencil and crayons, how many of each would you need to buy?

Solution Least number of Pencil and crayons

= LCM (24, 32)

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

= 96 Pencil & crayons.

2	24, 32
2	12, 16
2	6, 8
2	3, 4
2	3, 2
3	3, 1
	1, 1

$\therefore$ Packs of pencils = $96 \div 24 = 4$

Packs of crayons = $96 \div 32 = 3$.

Q.10 Reduce each of the following fractions to the lowest terms:

(i) $\frac{161}{207}$ (ii) $\frac{296}{481}$

Sol: (i) In order to get lowest form, numerator and denominator are divided by their HCF

$\because 161 = 7 \times 23$

$207 = 3 \times 3 \times 23$

$\therefore$ HCF $= 23$

lowest terms $= \frac{161 \div 23}{207 \div 23} = \frac{7}{9}$

(ii) HCF (296, 481)

$296 = 2 \times 2 \times 2 \times 37$

$481 = 13 \times 37$

$\therefore$ HCF $= 37$

hence, lowest term $= \frac{296 \div 37}{481 \div 37} = \frac{8}{13}$

Q.11 A merchant has 120 litres of oil of one kind, 180 litres of another kind and 240 litres of third kind. He wants to sell the oil by filling the three kinds of oil in tins of equal capacity. What should be the greatest capacity of such tin?

Sol: greatest capacity of tin = HCF (120, 180, 240)

$\because 120 = 2 \times 2 \times 2 \times 3 \times 5$; $180 = 2 \times 2 \times 3 \times 3 \times 5$

$240 = 2 \times 2 \times 2 \times 2 \times 3 \times 5$

$\therefore$ HCF $= 2 \times 2 \times 3 \times 5 = 60$ litres.

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