HCFs and LCMs

HcFs

Primes 2, 3, 5, 7, 11, 13

Ex1   Find HCF of 64 and 80

$$2 \overline{)64}$$
$$2 \overline{)32}$$
$$2 \overline{)16}$$
$$2 \overline{)8}$$
$$2 \overline{)4}$$
$$2 \overline{)2}$$
$$1$$

$$2 \overline{)80}$$
$$2 \overline{)40}$$
$$2 \overline{)20}$$
$$2 \overline{)10}$$
$$5 \overline{)5}$$
$$1$$

$$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$80 = 2 \times 2 \times 2 \times 2 \times 5$$

$$HCF = 2 \times 2 \times 2 \times 2 = 16$$

Ex2   72   and   84

$$2 \overline{)72}$$
$$2 \overline{)36}$$
$$2 \overline{)18}$$
$$3 \overline{)9}$$
$$3 \overline{)3}$$
$$1$$

$$2 \overline{)84}$$
$$2 \overline{)42}$$
$$3 \overline{)21}$$
$$7 \overline{)7}$$
$$1$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

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

$$HCF = 2 \times 2 \times 3 = 12$$

Exercise B

Find the HCF and the LCM of the following pairs of numbers:

Primes   2, 3, 5, 7, 11, 13

1.   18 and 24
2.   50 and 75
3.   30 and 45
4.   36 and 54
5.   28 and 42

1)
$$2\,|\,18 \qquad 2\,|\,24$$
$$3\,|\,9 \qquad\;\; 2\,|\,12$$
$$3\,|\,3 \qquad\;\; 2\,|\,6$$
$$1 \qquad\qquad 3\,|\,3$$
$$1$$

$18 = 2 \times 3 \times 3$

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

$HCF = 2 \times 3 = 6$

2)
$$2\,|\,50 \qquad 3\,|\,75$$
$$5\,|\,25 \qquad 5\,|\,25$$
$$5\,|\,5 \qquad\;\; 5\,|\,5$$
$$1 \qquad\qquad 1$$

$50 = 2 \times 5 \times 5$

$75 = 3 \times 5 \times 5$

$HCF = 5 \times 5 = 25$

LCM

The lowest common multiple is the lowest number both numbers will divide into

Ex 1   36 and 48

36   72   108   (144)   180

48   96   (144)

$LCM = 144$

LCM is the first number in both lists of multiples

Ex 2   34   and   51

34   68   (102)   136   170

51   (102)   LCM = 102

Ex 3   45   and   60

45   90   135   (180)   225

60   120   (180)   LCM = 180

PRIME FACTORS, HCF AND LCM

Exercise A

Write the following numbers as a product of their prime factors:

1.   20   6.   99

2.   18   7.   90

3.   30   8.   84

4.   32   9.   70

5.   100   10.   110

Exercise B

Find the HCF and the LCM of the following pairs of numbers:

1.   18 and 24

2.   50 and 75

3.   30 and 45

4.   36 and 54

5.   28 and 42

PRIME FACTORS, HCF AND LCM

Exercise A

1. 20

$$2 \overline{)20}$$
$$2 \overline{)10}$$
$$5 \overline{)5}$$
$$1$$

$20 = 2 \times 2 \times 5$

or $20 = 2^2 \times 5$

2. 18

$$2 \overline{)18}$$
$$3 \overline{)9}$$
$$3 \overline{)3}$$
$$1$$

$18 = 2 \times 3 \times 3$

or $18 = 2 \times 3^2$

3. 30

$$2 \overline{)30}$$
$$3 \overline{)15}$$
$$5 \overline{)5}$$
$$1$$

$30 = 2 \times 3 \times 5$

4. 32

$$2 \overline{)32}$$
$$2 \overline{)16}$$
$$2 \overline{)8}$$
$$2 \overline{)4}$$
$$2 \overline{)2}$$
$$1$$

$32 = 2 \times 2 \times 2 \times 2 \times 2$

or $32 = 2^5$

5. 100

$$2 \overline{)100}$$
$$2 \overline{)50}$$
$$5 \overline{)25}$$
$$5 \overline{)5}$$
$$1$$

$100 = 2 \times 2 \times 5 \times 5$

or $100 = 2^2 \times 5^2$

6. 99

$$3 \overline{)99}$$
$$3 \overline{)33}$$
$$11 \overline{)11}$$
$$1$$

$99 = 3 \times 3 \times 11$

or $99 = 3^2 \times 11$

7. 90

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

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

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

8. 84

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

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

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

9. 70

$$\begin{array}{c|c} 2 & 70 \\ 5 & 35 \\ 7 & 7 \\ \hline & 1 \end{array}$$

$70 = 2 \times 5 \times 7$

10. 110

$$\begin{array}{c|c} 2 & 110 \\ 5 & 55 \\ 11 & 11 \\ \hline & 1 \end{array}$$

$110 = 2 \times 5 \times 11$

Exercise B

1. 18 and 24

$$\begin{array}{c|c} 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array} \qquad \begin{array}{c|c} 2 & 24 \\ 2 & 12 \\ 2 & 6 \\ 3 & 3 \\ \hline & 1 \end{array}$$

$18 = ②\times③\times 3$

$24 = ②\times 2 \times 2 \times ③$

$HCF = 2 \times 3 = 6$

$LCM = 2 \times 3 \times 3 \times 2 \times 2 = 72$

PRIME FACTORS, HCF AND LCM   EXERCISE

1. Alternative method for LcM

    18   36   54 (72) 90

                               LCM = 72

    24   48 (72) 96

2. 50 and 75

$$\begin{array}{r|r} 2 & 50 \\ 5 & 25 \\ 5 & 5 \\ \hline & 1 \end{array} \qquad \begin{array}{r|r} 3 & 75 \\ 5 & 25 \\ 5 & 5 \\ \hline & 1 \end{array}$$

$50 = 2 \times (5) \times (5)$

$75 = 3 \times (5) \times (5)$

$HcF = 5 \times 5 = 25$

$LcM = 2 \times 5 \times 5 \times 3 = 150$

Alternative method for LcM

   50   100 (150) 200

                          LcM = 150

   75   (150)

3. 30 and 45

$$\begin{array}{r|r} 2 & 30 \\ 3 & 15 \\ 5 & 5 \\ \hline & 1 \end{array} \qquad \begin{array}{r|r} 3 & 45 \\ 3 & 15 \\ 5 & 5 \\ \hline & 1 \end{array}$$

$30 = 2 \times (3) \times (5)$

$45 = 3 \times (3) \times (5)$

$HcF = 3 \times 5 = 15$

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

Alternative method for LcM

   30 60 (90) 120

                        LcM = 90

   45 (90)

4. 36 and 54

$$\begin{array}{c|c} 2 & 36 \\ 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array} \qquad \begin{array}{c|c} 2 & 54 \\ 3 & 27 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$$

$36 = ②× 2 ×③×③$

$54 = ②×③ × ③× 3$

$HCF = 2 × 3 × 3 = 18$

$LCM = 2 × 2 × 3 × 3 × 3 = 108$

Alternative method for LCM

36   72   ⑩⑧   144

54   ⑩⑧

$LCM = 108$

5. 28 and 42

$$\begin{array}{c|c} 2 & 28 \\ 2 & 14 \\ 7 & 7 \\ \hline & 1 \end{array} \qquad \begin{array}{c|c} 2 & 42 \\ 3 & 21 \\ 7 & 7 \\ \hline & 1 \end{array}$$

$28 = ②× 2 ×⑦$

$42 = ②× 3 ×⑦$

$HCF = 2 × 7 = 14$

$LCM = 2 × 2 × 7 × 3 = 84$

Alternative method for LCM

28   56   ⑧④   112

42   ⑧④   126

$LCM = 84$

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