

Exercise 2-6

Q.1 Find the HCF of the following numbers using Prime factorization Method:

(i) 144, 198

(ii) 81, 117

(iii) 84, 98 (iv) 225, 450

(v) 170, 238

(vi) 504, 980

(vii) 150, 140, 210

(viii) 84, 120, 138

(ix) 106, 159, 265

Solution (i)

$$\begin{array}{r|l}
 2 & 144 \\
 \hline
 2 & 72 \\
 \hline
 2 & 36 \\
 \hline
 2 & 18 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 198 \\
 \hline
 3 & 99 \\
 \hline
 3 & 33 \\
 \hline
 11 & 11 \\
 \hline
 & 1
 \end{array}$$

$$\therefore 144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$198 = 2 \times 3 \times 3 \times 11$$

$$\text{hence HCF}(144, 198) = 2 \times 3 \times 3 = 18$$

(ii) 81, 117

$$\begin{array}{r|l}
 3 & 81 \\
 \hline
 3 & 27 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 3 & 117 \\
 \hline
 3 & 39 \\
 \hline
 13 & 13 \\
 \hline
 & 1
 \end{array}$$

$$\therefore 81 = 3 \times 3 \times 3 \times 3$$

$$117 = 3 \times 3 \times 13$$

$$\text{hence HCF}(81, 117) = 3 \times 3 = 9$$

(iii) 84, 98

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

$$\begin{array}{r|l}
 2 & 98 \\
 \hline
 7 & 49 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

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

$$98 = 2 \times 7 \times 7$$

$$\text{hence HCF}(84, 98) = 2 \times 7 = 14$$

(iv) 225, 450

$$\begin{array}{r|l}
 5 & 225 \\
 \hline
 5 & 45 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 5 & 450 \\
 \hline
 5 & 90 \\
 \hline
 3 & 18 \\
 \hline
 3 & 6 \\
 \hline
 2 & 2 \\
 \hline
 & 1
 \end{array}$$

$$\therefore 225 = 3 \times 3 \times 5 \times 5$$

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

$$\text{hence HCF}(225, 450) = 3 \times 3 \times 5 \times 5 = 225$$

(v) 170, 238

$$\begin{array}{r|l}
 2 & 170 \\
 \hline
 5 & 85 \\
 \hline
 17 & 17 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 238 \\
 \hline
 7 & 119 \\
 \hline
 17 & 17 \\
 \hline
 & 1
 \end{array}$$

$$\therefore 170 = 2 \times 5 \times 17$$

$$238 = 2 \times 7 \times 17$$

$$\text{hence HCF}(170, 238) = 2 \times 17 = 34$$

(vi) 504, 980

$$\begin{array}{r|l}
 2 & 504 \\
 \hline
 2 & 252 \\
 \hline
 2 & 126 \\
 \hline
 3 & 63 \\
 \hline
 3 & 21 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 980 \\
 \hline
 2 & 490 \\
 \hline
 5 & 245 \\
 \hline
 7 & 49 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\therefore 504 = 2 \times 2 \times 2 \times 3 \times 3 \times 7$$

$$980 = 2 \times 2 \times 5 \times 7 \times 7$$

$$\text{hence HCF}(504, 980) = 2 \times 2 \times 7 = 28$$

(vii) 150, 140, 210

$$\begin{array}{r|l}
 2 & 150 \\
 \hline
 3 & 75 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 140 \\
 \hline
 2 & 70 \\
 \hline
 5 & 35 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 2 & 210 \\
 \hline
 3 & 105 \\
 \hline
 5 & 35 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

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

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

$$210 = 2 \times 3 \times 5 \times 7$$

$$\text{hence HCF}(150, 140, 210) = 2 \times 5 = 10$$

(viii) 84, 120, 138

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

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

$$\begin{array}{r|l}
 2 & 138 \\
 \hline
 3 & 69 \\
 \hline
 23 & 23 \\
 \hline
 & 1
 \end{array}$$

$$84 = \underline{2} \times \underline{2} \times \underline{3} \times 7$$

$$120 = \underline{2} \times \underline{2} \times \underline{2} \times \underline{3} \times 5$$

$$138 = \underline{2} \times \underline{3} \times 23$$

$$\text{hence HCF}(84, 120, 138) = 2 \times 3 = 6$$

$$(ix) \underline{106, 159, 265}$$

$$\begin{array}{r|l} 2 & 106 \\ \hline 53 & 53 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 3 & 159 \\ \hline 53 & 53 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 265 \\ \hline 53 & 53 \\ \hline & 1 \end{array}$$

$$106 = 2 \times 53$$

$$159 = 3 \times 53$$

$$265 = 5 \times 53$$

$$\text{hence HCF}(106, 159, 265) = 53$$

Q.2 What is the HCF of two consecutive

(i) Numbers (ii) even numbers (iii) odd numbers

Sol! (i) HCF of two consecutive numbers is 1.

(ii) HCF of two consecutive even numbers is 2.

(iii) HCF of two consecutive odd numbers is 1.

Q.3 HCF of coprime numbers 4 and 15 was found as follows: $4 = 2 \times 2$ and $15 = 3 \times 5$

Since there is no common factor. So, HCF of 4 and 15 is 1. Is the answer correct? If not what is the correct HCF?

Solution . No, HCF of 4 and 15 is not zero.

As we know if there is no common factor then 1 is always a common factor.

hence 1 is a HCF of 4 and 15.
