Prime Factors, HCF & LCM Tutorial

1

Here are 10 numbers.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
Which of the above are prime numbers, composite numbers and neither?

2

Written as a product of its prime factors, $1008 = 2^x \times 3^y \times 7$.
Find the values of x and y.

3

Find the highest common factor of 80, 120 and 280.

4

Find the lowest common multiple of 5, 15 and 30.

5

Express 150 as the product of its prime factors.
Find the HCF of 48 and 150.

Bread rolls are sold in packs of 48.
Chocolate bars are sold in packs of 150.
John buys the same number of bread rolls as chocolate bars.
Find the least number of packs of chocolate bars that he could have brought.

6

Express 168 and 4900 as a product of their prime factors.

Hence write down
LCM$(168, 4900)$, giving your answer as the product of its prime factors,
the greatest integer that will divide both 168 and 4900 exactly.

7

The lights on three lightships flash at regular intervals.
The first light flashes every 12 seconds.
The second light flashes every 27 seconds.
The third light flashes every 90 seconds.
The three light flash together at 0900.
At what time do they next flash together?

8

Written as a product of its prime factors, $13475 = a^2 \times b^2 \times 11$.
Find the value of ab.

9

Find the square root of 256 without using a calculator.

10

Find the cube root of 3375 without using a calculator.

11

Given that $30k$ is a perfect square, what is the the smallest integar k?

12

Express 1350 as a product of its prime factors.
Find the smallest positive interger k such that $\frac{1350}{k}$ is a square number.

13

Express 1800 as the product of its prime factors.
Given that $1800k$ is a perfect cube, what is the smallest possible value of k?
Find the highst common factor of 42 and 1800.

14

When written as the product of their prime factors,

$$\begin{cases} p = 2^3 \times 3^6 \\ q = 2 \times 3^2 \times 5 \\ r = 2^2 \times 3 \times 7 \end{cases}$$

Find
the value of the cube root of p,
the LCM of p, q and r, giving your answer as the product of its prime factors,
the greatest number that will divide p, q and r exactly.

15 !

Express 450 as the product of its prime factors.
Find two numbers, both smaller than 100,
that have a LCM of 450 and a HCF of 15.

16 !

When $\text{HCF}(a, b) = 1$, a and b are considered to be co-prime with each other.
It is given that if $\text{HCF}(a, b) = 1$, then $\text{HCF}(a + b, ab) = 1$.
It is also given that 97 and 101 are prime numbers.
Explain whether 198 and 9797 are co-prime with each other.