HOME WORK - 1 (answers)

1)
1
2^1
3^1
$4 = 2^2$
5^1
$6 = 2 \times 3$
7^1
$8 = 2^3$
$9 = 3^2$
$10 = 2 \times 5$
$LCM = 2^3 \times 3^2 \times 5 \times 7 = 2520$ (d)

2) $\frac{380}{18} = 21.\bar{1}$

We know that HCF of two numbers must be a factor of their LCM.
Here, 18 is not a factor of 380.
Hence, no two numbers can have 18 as their HCF and 380 as their LCM.

3) $6 = 2 \times 3$
$72 = 2^3 \times 3^2$
$120 = 2^3 \times 3 \times 5$
$HCF = 2 \times 3 = 6$
$LCM = 2^3 \times 3^2 \times 5 = 360$

4) Let us assume that $\sqrt{5}$ is a rational number
Then, $\sqrt{5} = \frac{a}{b}$; where a and b are co-primes and $b \neq 0$

$\Rightarrow \sqrt{5}b = a$
Squaring on both sides, $5b^2 = a^2 \longrightarrow (1)$
$\Rightarrow 5$ divides a^2
$\Rightarrow 5$ divides a
Let $a = 5c$; where c is any integer.

From eq. (1), $5b^2 = 25c^2$

$$\Rightarrow b^2 = 5c^2$$

$\Rightarrow$ 5 divides b^2

$\Rightarrow$ 5 divides b

Thus, 5 is a common factor of a and b.
This contradicts the fact that a and b are co-prime numbers (ie, HCF = 1).
This contradiction arises due to our wrong assumption that $\sqrt{5}$ is a rational number.
Hence, $\sqrt{5}$ is an irrational number.

5) Let us assume that $6+\sqrt{2}$ is a rational number.
Then, $6+\sqrt{2} = \frac{p}{q}$; where p and q are co-prime integers, $q \neq 0$

$$\Rightarrow \sqrt{2} = \frac{p}{q} - 6$$

$$\Rightarrow \sqrt{2} = \frac{p-6q}{q}$$

Since p and q are integers, $\frac{p-6q}{q}$ is a rational number. Then $\sqrt{2}$ is also a rational number.
But this contradicts the fact that $\sqrt{2}$ is an irrational number (given).
This contradiction arises due to our wrong assumption that $6+\sqrt{2}$ is a rational number.
Hence, $6+\sqrt{2}$ is irrational.

6) $21^n = (3\times7)^n = 3^n \times 7^n$
Thus, the prime factorisation of 21^n contains factors 3 and 7 only.
We know that for any number raised to the power n to end with digits 2, 4, 6, 8, its prime factorisation must contain 2 as a prime factor. Also, to ends with digit 0, its prime factorisation must contain 2 and 5 as prime factors. Hence, for no value of n

for which 21^n can end with digit 0,2,4,6,8.

7) We know that, for any two positive integers a and b,

$HCF(a,b) \times LCM(a,b) = a \times b$

Let the other number be x

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

$\therefore x = \dfrac{\cancel{145} \times \cancel{2175}^{435}}{\cancel{725}_{\cancel{145}\ 1}} = 435$

Hence, the other number is 435

8) $LCM = 14 HCF \rightarrow (1)$

$LCM + HCF = 600$

$\Rightarrow 14 HCF + HCF = 600$ [from eq: (1)]

$\Rightarrow 15 HCF = 600$

$HCF = \dfrac{600}{15} = 40$

$LCM = 14 \times 40 = 560$

We know that, for any two positive integers

$HCF \times LCM =$ product of no.s

$\Rightarrow 40 \times 560 = 280 \times$ other number

$\therefore$ the other number $= \dfrac{40 \times \cancel{560}^{2}}{\cancel{280}_{1}}$

$= 40 \times 2 = \underline{\underline{80}}$

9) Assertion :- true

Reason :- true

(a) assertion and reason are true and reason is the correct explanation of assertion

10) $615 - 6 = 609 = 3 \times 7 \times 29$

$963 - 6 = 957 = 3 \times 11 \times 29$

$HCF(609, 957) = 3 \times 29 = 87$

Hence, the required largest number is 87.