Practice Questions - Term I

Date: 09/11/2021

Subject: Mathematics

Topic : Real Numbers

Class: X

1. Prime factorization of 1400:

A. $2.3^2.5^3$

B. $2^3.5.7$

C. $2^3.5^2.7^2$

D. $2^3.5^2.7$

Prime factorisation of 1400:

2	1400
2	700
2	350
5	175
5	35
	7

$1400 = 2^3.5^2.7$

Practice Questions - Term I

2. The sum of prime factors of 4620 is:

A. 30

B. 28

C. 32

D. 34

$4620 = 2^2 \times 3 \times 5 \times 7 \times 11$
Hence, the prime factors are 2, 3, 5, 7 and 11.
Sum of prime factors = 2 + 3 + 5 + 7 + 11 = 28

3. If $a = 2^3 \times 3^2 \times 5$ and $b = 2^4 \times 3 \times 7^2$, then which of the following is true?

A. HCF = $2^3 \times 3^2 \times 5 \times 7$
LCM = $2^7 \times 3^3 \times 5 \times 7^2$

B. HCF = $2 \times 3 \times 5 \times 7$
LCM = $2^2 \times 3^2 \times 5 \times 7^2$

C. HCF = $2^3 \times 3^2$
LCM = $2^4 \times 3^2 \times 5 \times 7^2$

D. HCF = $2^3 \times 3$
LCM = $2^4 \times 3^2 \times 5 \times 7^2$

HCF is the product of common prime factors with their lowest power.

LCM is the product of prime factors with their highest power.

Given : $a = 2^3 \times 3^2 \times 5$ and $b = 2^4 \times 3 \times 7^2$

$\Rightarrow$ HCF of *a* and *b* = $2^3 \times 3$ (Taking the product of lowest powers of common factors)

LCM of *a* and *b* = $2^4 \times 3^2 \times 5 \times 7^2$ (Taking the product of prime factors with their highest power)

4. The decimal expansions of $\frac{13}{6250}$ is

A. 0.00416

B. 0.00512

C. 0.00208

D. 0.0208

$\frac{13}{6250} = \frac{13}{2^1.5^5}$

To get the denominator in powers of 10, multiply both numerator and denominator by 2^4

$\Rightarrow \frac{13}{6250} = \frac{13 \times 2^4}{5^5 \times 2^5}$

$\frac{13}{6250} = 13 \times \frac{2^4}{10^5} = \frac{208}{10^5} = 0.00208$

5. For $\sqrt{3}x^2$ to be irrational, x should be

A. always irrational.

B. always rational.

C. irrational or rational.

D. cannot be determined.

Let's assume x = $2 - \sqrt{3}$

$\Rightarrow \sqrt{3}x^2 = \sqrt{3}\,(2 - \sqrt{3})^2$ which is irrational.

Again, assume $x = 2$

$\Rightarrow \sqrt{3}\,x^2 = \sqrt{3}\,(2)^2$ which is also irrational.

Practice Questions - Term I

6. The decimal expansion of $\frac{141}{120}$ will terminate after how many places?

A. 3

B. 5

C. 7

D. Will not terminate

Given rational number $\frac{141}{120}$

Here, $120 = 2^3 \times 3 \times 5$

$141 = 3 \times 47$

$\Rightarrow \frac{141}{120} = \frac{3 \times 47}{2^3 \times 3 \times 5}$

$= \frac{47}{2^3 \times 5}$

Multiply and divide by 5^2.

$= \frac{47 \times 5^2}{2^3 \times 5 \times 5^2}$

$= \frac{47 \times 25}{(2 \times 5)^3}$

$= \frac{1175}{1000}$

= 1.175

Therefore, $\frac{141}{120}$ will terminate after three decimal places.

Practice Questions - Term I

7. Two numbers are in the ratio of 15:11. If their H.C.F is 13, the numbers will be:

- ✔ **A.** 195 and 143
- ✖ **B.** 190 and 140
- ✖ **C.** 185 and 163
- ✖ **D.** 185 and 143

Let the required numbers be 15x and 11x.

Now, 15x = 3 $\times$ 5 $\times$ x ...(i)
11x = 11 $\times$ x ...(ii)

From (i) and (ii), we can say that x is the only common factor for both 15x and 11x.
$\therefore$ x is the H.C.F. of 15x and 11x.

It is given that the H.C.F of the numbers is 13.
$\therefore x = 13$

$\therefore$ The numbers are 15×13 and 11×13 i.e. 195 and 143.

8. We have 38 cakes. Each box can hold 5 cakes only. How many boxes we need to pack and how many cakes are unpacked?

- ✔ **A.** 7, 3
- ✖ **B.** 7, 4
- ✖ **C.** 6, 8
- ✖ **D.** 8, 2

Let number of cakes be a and capacity of box be b.

$\therefore$ a = 38, b = 5

By Euclid's division lemma
$a = bq + r, \ 0 \leq r < |b|$
$38 = 5 \times (7) + 3, \ 0 \leq 3 < |5|$
Therefore, Quotient q = 7and remainder r = 3

We see that 7 boxes are required to pack 38 cakes with 3 cakes left over.

9. The HCF of two numbers is 18 and their product is 12960. Find their LCM.

A. 280

B. 520

C. 720

D. 270

For any two numbers a and b,
LCM (a, b) $\times$ HCF (a, b) = $a \times b$
Thus, LCM $\times 18 = 12960$
$\Rightarrow$ LCM = 720

10. If $\frac{12}{q}$ is a terminating decimal number, then which of the following is a possible value of q?

A. 7

B. 9

C. 15

D. 21

$\frac{12}{7} \rightarrow$ denominator = 7
$\frac{12}{9} = \frac{4}{3} \rightarrow$ denominator = 3
$\frac{12}{15} = \frac{4}{5} \rightarrow$ denominator = 5 (of the form $2^m \times 5^n$)
$\frac{12}{21} = \frac{4}{7} \rightarrow$ denominator = 7
Thus, among the given options, the only possible value of q that satisfies the given condition is 15.

Practice Questions - Term I

11. If $\sqrt{3}$ is an irrational number, then which of the following is an irrational number?

A. $\sqrt{3}-\sqrt{3}$

B. $\sqrt{3}(2\sqrt{3}-\sqrt{3})$

C. $(\sqrt{3}-1)(\sqrt{3}+1)$

D. $\sqrt{3}(\sqrt{3}-1)$

$\sqrt{3}-\sqrt{3}=0 \rightarrow$ rational number
$\sqrt{3}(2\sqrt{3}-\sqrt{3})=6-3=3 \rightarrow$ rational number
$(\sqrt{3}+1)(\sqrt{3}+1)=3-1=2 \rightarrow$ rational number
$\sqrt{3}(\sqrt{3}-1)=3-\sqrt{3} \rightarrow$ irrational number
(Sum/difference of a rational number and an irrational number is irrational.)

12. The largest 4-digit number exactly divisible by 88 is ___.

A. 9944

B. 9988

C. 9966

D. 8888

The largest 4-digit number is 9999. By Euclid's division lemma -
$9999=88\times 113+55$
$\Rightarrow$We need to reduce 55 from 9999 so that the resulting number is divisible by 88.
i.e., $9999-55=9944$ is divisible by 88.
$\therefore$ 9944 is the largest 4-digit number divisible by 88.

13. If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is:

A. 4

B. 2

C. 1

D. 3

By Euclid's division algorithm,
$b = aq + r,\ 0 \leq r < a$ [$\because$ dividend = divisor $\times$ quotient + remainder]
$\Rightarrow 117 = 65 \times 1 + 52$
$\Rightarrow 65 = 52 \times 1 + 13$
$\Rightarrow 52 = 13 \times 4 + 0$
$\therefore HCF(65, 117) = 13 \ldots (i)$

Also, given that, $HCF(65, 117) = 65m - 117 \ldots (ii)$
From equations (i) and (ii),
$65m - 117 = 13$
$\Rightarrow 65m = 130$
$\Rightarrow m = 2$

Practice Questions - Term I

14. The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they all change simultaneously at 8 AM then at what time will they again change simultaneously.

- **A.** 8:09 AM
- **B.** 8:12 AM
- **C.** 8:15 AM
- **D.** 8:18 AM

Time period after which these lights will change = LCM of 48, 72, 108

48 = 2 × 2 × 2 × 2 × 3
72 = 2 × 2 × 2 × 3 × 3
108 = 2 × 2 × 3 × 3 × 3

LCM (48, 72, 108) = 2 × 2 × 2 × 2 × 3 × 3 × 3 = 432

After 432 sec
= 432÷(60×60)
=432÷3600
=0.12 hrs

Hence, next simultaneous change will take place at = 8.00 + 0.12 = 8.12 AM

15. If the HCF and LCM of two consecutive (positive) even numbers is 2 and 84, the sum of the numbers is:

A. 22

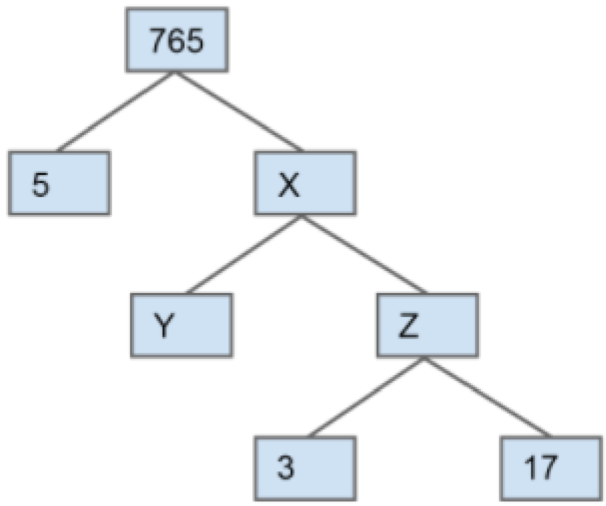
B. 24

C. 26 ✔

D. 28

Let the first number $= x$
Then, second number $= x + 2$
$HCF = 2$
$LCM = 84$
We know that the product of two numbers $= HCF \times LCM$
$\Rightarrow x \times (x + 2) = 2 \times 84$
$\Rightarrow x^2 + 2x - 168 = 0$
$\Rightarrow x^2 - 12x + 14x - 168 = 0$
$\Rightarrow x(x - 12) + 14(x - 2) = 0$
$\Rightarrow x = 12, x + 2 = 14 (\because$ Both the numbers are positive.)
$\Rightarrow x + x + 2 = 12 + 14 = 26$

16. In the given factor tree, the value of $x+y+z$ is:



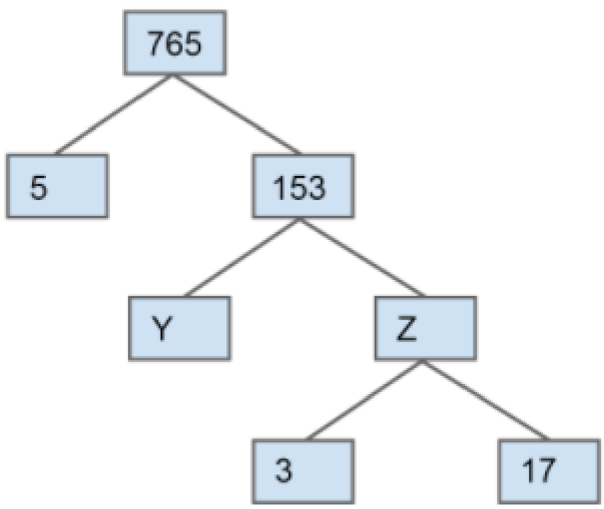
A. 213

B. 211

C. 209

D. 207

Factorisation of 765 by factor tree method



$\Rightarrow x = 153$
$z = (3)(17) = 51$
$y = \dfrac{x}{z} = \dfrac{153}{51} = 3$
$\therefore x + y + z = 153 + 3 + 51 = 207$

17. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is:

A. 630

B. 1080

C. 2520

D. 5040

1 = 1
2 = 1*2
3 = 1*3
4 = 1*2*2
5 = 1*5
6 = 1*2*3
7 = 1*7
8 = 1*2*2*2
9 = 1*3*3
10 = 1*2*5
LCM of number 1 to 10 = LCM(1,2,3,4,5,6,7,8,9,10)
LCM of number 1 to 10= 1*2*2*2*3*3*5*7 = 2520

18. HCF of two numbers is 1 and LCM is 253. If one of the two numbers is 11, find the other.

A. 13

B. 17

C. 23

D. 15

Let the unknown number be x.
Second number is 11.
Now, HCF $\times$ LCM = product of the two numbers
$\Rightarrow 1 \times 253 = 11 \times x$
$\Rightarrow x = 23$

$\therefore$ The unknown number is 23.

Practice Questions - Term I

19. Which of the following numbers is not irrational?

A. $5+\sqrt{2}$

B. $5-\sqrt{2}$

C. $5+\sqrt{3}$

D. $5+\sqrt{9}$ ✓

We know that, $\sqrt{2}, \sqrt{3}$ are irrational numbers.
So, if we add any number to $\sqrt{2}, \text{ or } \sqrt{3}$, the resulting number will also be irrartional.

Also, $\sqrt{9}=3$ is not an irrational number.
Hence, $5+\sqrt{9}=5+3=8$ is not irrational.

20. S1 : $\frac{1323}{1400}$ is a non terminating decimal.
S2 : A number $\frac{p}{q}$ where p and q are co-primes is terminating if q is of the form $2^n.3^m$ where n and m are non-negative integers.

A. S1 and S2 are true.

B. S1 and S2 are false

C. S1 is false and S2 is true

D. S1 is true and S2 is false ✓

1400 = $2^3 \times 5^2 \times 7$

$\Rightarrow$ The denominator is not in the form of $2^n 5^m$.

Therefore, the given rational number has non- terminating decimal expansion.

Hence, S1 is true.

A number $\frac{p}{q}$ where p and q are co-primes is terminating if q is of the form $2^m.5^n$.

Hence S2 is false.