CHAPTER – 3

Playing with Numbers

EXERCISE – 3.5

Q. 1

Which of the following statements are true?

(a) If a number is divisible by 3, it must be divisible by 9.
(b) If a number is d divisible by 9, it must be divisible by 3.
(c) A number is divisible by 18, if it is divisible by both 3 and 6.
(d) If a number is divisible by 9 and 10 both, then it must be divisible by 90.
(e) If two numbers are co-prime, at least one of them must be prime.
(f) All numbers which are divisible by 4 must also be divisible by 8.
(g) All numbers which are divisible by 8 must also be divisible by 4.
(h) If a number exactly divides two numbers separately, it must exactly divide their su,
(i) If a number exactly divides the sum of two numbers, it must exactly divide the two numbers separately.

Answer:

a. False.

For example – 6 is divisible by 3, but it is not divisible by 9.

b. True.

Example- 18, is divisible by 3 as well as 9 so, yes, If a number is divisible by 9, it must be divisible by 3.

c. False.

If a number is divisible by 3 and 6, it is not necessary that it is also divisible by 18.

Example – 42 it is divisible by 6 and 3 but not by 18.

d. True.

As $9 \times 10 = 90$ So, if a number is divisible by 9 and 10 both, then it must be divisible by 90.

e. False.

Example – 15 and 32 are co-prime and composite.

f. False.

Example – 20 is divisible by 4 but not by 8. So, it's not necessary that all numbers which are divisible by 4 must also be divisible by 8.

g. True.

As we know $8 = 2 \times 4$ so all numbers which are divisible by 8 must also be divisible by 2 and 4.

h. True.

Example – 3 divides 6 and 9 separately and 15, which is the sum of 9 and 6. So, if a number exactly divides two numbers separately, it must exactly divide their sum.

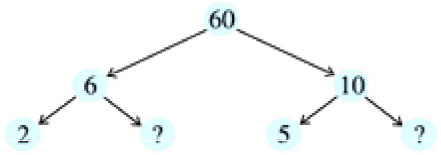
i. False.

Example- 2 divide 12 but it doesn't divide 3 and 9. So, if a number exactly divides the sum of two numbers, it's not necessary that it also divide the two numbers separately.

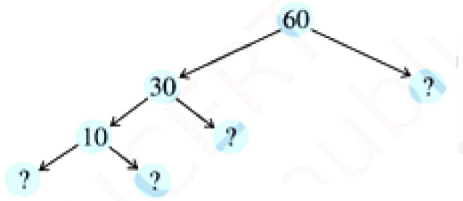
Q. 2

Here are two different factor trees for 60. Write the missing numbers.

(a)



(b)



Answer:

a. Let's take 'a' be the missing number,

So, we have,

$2 \times a = 6$

$a = 6/2 = 3$

$a = 3$

So,

$2 \times 3 = 6$

And

$5 \times a = 10$

$a = 10/5 = 2$

$5 \times 2 = 10$

Missing numbers are 3 and 2

b. As we know $60 = 30 \times 2$

$30 = 10 \times 3$

$10 = 5 \times 2$

Missing numbers are, 2, 5, 3 and 2.

Q. 3

Which factors are not included in the prime factorisation of a composite number?

Answer:

1 and the number itself are not included in the prime factorisation of a composite number.

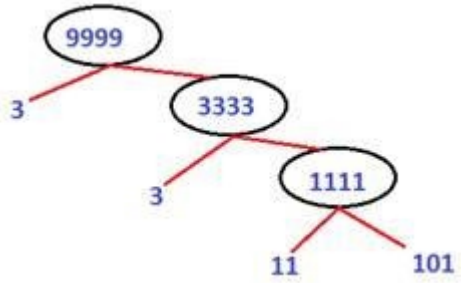
Q. 4

Write the greatest 4-digit number and express it in terms of its prime factors.

Answer:

Greatest four-digit number = 9999

Let's draw the factor tree-



So the prime factors are;

$9999 = 3 \times 3 \times 11 \times 101$

Q. 5

Write the smallest 5-digit number and express it in the form of its prime factors.

Answer:

Smallest 5-digit number = 10,000

Draw the factor tree,

2	10000
2	5000
2	2500
2	1250
5	625
5	125
5	25
5	5
	1

So the factors are;

$10000 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$

Q. 6

Find all the prime factors of 1729 and arrange them in ascending order. Now state the relation, if any; between two consecutive prime factors.

Answer:

Calculate the factors first;

7	1729
13	247
19	19
	1

So we have;

$1729 = 7 \times 13 \times 19$

$13 - 7 = 6$

$19 - 13 = 6$

Difference of two consecutive prime factors is 6.

Q. 7

The product of three consecutive numbers is always divisible by 6. Verify this statement with the help of some examples.

Answer:

Let's take,

$2 \times 3 \times 4 = 24$, this is divisible by 6

$9 \times 10 \times 11 = 990$, this is divisible by 6

$20 \times 21 \times 22 = 9240$, this is divisible by 6

$31 \times 32 \times 33 = 32, 736$, this is divisible by 6

So, the product of three consecutive numbers is always divisible by 6.

Q. 8

The sum of two consecutive odd numbers is divisible by 4. Verify this statement with the help of some examples.

Answer:

$5 + 7 = 12$, it is divisible by 4,

$15 + 17 = 32$, divisible by 4,

$17 + 19 = 36$, divisible by 4,

$21 + 23 = 44$, divisible by 4.

Therefore, the sum of two consecutive odd numbers is divisible by 4.

Q. 9

In which of the following expressions, prime factorisation has been done?

(a) $24 = 2 \times 3 \times 4$
(b) $56 = 7 \times 2 \times 2 \times 2$
(c) $70 = 2 \times 5 \times 7$
(d) $54 = 2 \times 3 \times 9$

Answer:

Prime factorization is finding the factors of a number that are all prime.

a. $24 = 2 \times 3 \times 4$

As we can see in this factorization 4 is a composite number, so prime factorization has not been done.

b. $56 = 7 \times 2 \times 2 \times 2$

Since all the factors are prime factors so, prime factorization has been done.

c. $70 = 2 \times 5 \times 7$

Since all the factors are prime factors so, prime factorization has been done.

d. $54 = 2 \times 3 \times 9$

As we can see in this factorization 9 is a composite number, so prime factorization has not been done.

Q. 10

Determine if 25110 is divisible by 45.

Answer:

According to the divisibility rule of 45 if the last digit of a number is divisible by 5 and the sum of the digits is divisible by 9, then the number is divisible by 45.

$45 = 5 \times 9$

Factors of 5 = 1 and 5

Factors of 9 = 1, 3 and 9

Therefore, 5 and 9 are co-prime numbers,

As the last digit of the number is 0 so it is divisible by 5.

Sum of the all digits = 2+5+1+1+0 = 9

As the sum of the digits is divisible by 9 so this number is also divisible by 9.

So, the number is divisible by 5 and 9, it is also divisible by 45.

Q.11

18 is divisible by both 2 and 3. It is also divisible by 2 × 3 = 6. Similarly, a number is divisible by both 4 and 6. Can we say that the number must also be divisible by 4 × 6 = 24? If not, give an example to justify your answer.

Answer:

No, it is not necessary because 12 and 36 are divisible by 4 and 6 both but are not divisible by 24.

Q. 12

I am the smallest number, having four different prime factors. Can you find me?

Answer:

As it is the smallest number, it will be the product of 4 smallest prime numbers;