

6th CLASS
MATHEMATICS

IT'S FOUNDATION

STUDY MATERIAL

2. PRIME AND COMPOSITE NUMBERS

TEACHING TASK:

① The least composite number is 4.

Ans: D

② The prime numbers between 1 and 20
are 2, 3, 5, 7, 11, 13, 17 and 19.

Number of numbers are 8.

Ans: B

③ 97 is a prime number because it is
only divisible by 1 and 97 itself.

Ans: D

- ④ Prime numbers between 1 and 100 are
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53,
59, 61, 67, 71, 73, 79, 83, 89, 97.

∴ Number of numbers from 1 to 100 are 25

Ans: D

- ⑤ 183 is a composite number because it has divisors other than 1 and itself.

Ans: C

- ⑥ 5 is a prime number it is the sum of 2 and 3 prime numbers.

Ans: C

- ⑦ All primes are odd: This statement is false, while many primes are indeed odd, 2 is an even prime number.

Ans: B

⑧ The twin prime numbers between 1 to 100 are (3, 5) (5, 7) (11, 13) (17, 19) (29, 31) (41, 43) (59, 61) (71, 73).

∴ Number of twin prime numbers in between 1 and 100, 8 pairs.

Ans: B

⑨ 23, 29 are not a twin prime because twin prime has difference of 2.

Ans: C

⑩ If two numbers do not have a common factor other than 1.

Ans: D

⑪ If a prime number is squared, the result is always a composite number. This is because squaring any prime number P greater than 2 results in P^2 , which has more than two positive divisors. 1, P and P^2 making it composite.

Ans: B

- 12) The first 3 prime numbers are 2, 3 and 5.
their product is $2 \times 3 \times 5 = 30$.

Ans: C

MULTIPLE CORRECT ANSWER TYPE

- 13) 12, 25, 30 are not a prime numbers.

Ans: a, c and d.

- 14) The two prime numbers between 50 and 60 are 53, and 59.

Ans: A and C.

STATEMENT TYPE :

- 15) Statment I is true. Even number greater than 2 are divisible by 2 and at least by 2 and themselves.

Statment II is correct but, correct explanation of Statment I.

Ans: B

- ①⑥ Statement I is true, 29 is a prime number because it has exactly two positive divisors. Statement II is false, while many prime numbers are indeed odd, 2 is a prime number that is even.

Ans: C

COMPREHENSION TYPE

COMPREHENSION-1

- ①⑦ Only 2 is a even prime.

Ans: B

- ①⑧ 69 is not a prime number because it has no divisors other than 1 and itself.

Ans: B

①⑨

Option A: 59, 41 are prime; their sum is

$$59 + 41 = 100$$

Ans: A

INTEGER TYPE:

(20) 1 is neither prime nor composite number

(21) The smallest prime number is 2.
and smallest composite number is 4.
Sum of these two $2+4=6$.

MATRIX MATCHING TYPE:

(22)
(a) Prime numbers below 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97.

Number of numbers are 25.

Ans: S

(b)
★ Number of composite numbers below 100 are subtraction of prime numbers.

$$\therefore 100 - 25 = 75$$

★ Ans: T

(c) There are total 24 odd Prime numbers present in between 1 to 100

Ans: 8

(d) Even composite numbers below 100 are

4, 6, 8, 10, 12, ..., 98 are 48.

Ans: 9

(23)

(a) Ans: 3

(b) Ans: 2

(c) Ans: 1

(d) Ans: 4

LEARNER'S TASK

Conceptual Understanding Questions (CUG's):

①

Prime numbers are greater than 1 and have no divisors other than 1 and themselves.

Composite numbers are greater than 1 and have divisors other than 1 and themselves.

The no. 1 does not meet the criteria for either category.

Ans: A

②

The only even prime number is 2. It is the only even number that has exactly two distinct positive divisors. 1 and itself.

Ans: A

③

111 is not an even number. It is odd because it does not end in 0, 2, 4, 6 and 8.

Ans: A

- (4) 99 is an odd number. It does not end in 0, 2, 4, 6 and 8.

Ans: D

- (5) The numbers that have only two factors, 1 and themselves are called prime numbers.

Ans: D

- (6) The number that have factors other than 1 and themselves are called composite numbers.

Ans: D

- (7) If n is odd, the sum n^2 is odd.
If n is even, the sum n^2 is even.

Ans: C

- (8) $S = n(n+1)$ equation for general form of every even number itself.

Ans: A

- ⑨ The sum of the first n even numbers is always an even number.

Ans: A

- ⑩ A pair of co-prime consists of two numbers that have no common divisors other than 1.

Ans: B

- ⑪ $\rightarrow 2$ is an even number because it is divisible by 2.

$\rightarrow 2$ is also a prime number because its only divisors are 1 and itself.

$\rightarrow 2$ is the least positive multiple of 2.

Ans: D

- ⑫ The least odd number is 1 and the greatest odd number below 100 is 99.

$$\begin{aligned}\text{Sum} &= 1 + 99 \\ &= 100.\end{aligned}$$

Ans: A

- (13) The prime numbers between 20 and 30 are 23 and 29.
So, there are 2 prime numbers between 20 and 30.
Ans: C
-

JEE MAINS LEVEL QUESTIONS

- ① First five prime numbers 2, 3, 5, 7 and 11

★ Sum of the prime number: $2+3+5+7+11=28$

Ans: 28 ★

- ② 53 is a prime number it is greater than 50.
Ans: B
-

- ③ By prime factorization method.

$$51 = 3 \times 17$$

$$51 = 3' \times 17'$$

$$(1+1)(1+1) = 2 \times 2$$

$$= 4$$

Ans: C

- ④ 13, 17, 19 are the consecutive primes.
 $\therefore$ 13, 17, and 19 are a prime triplet.

Ans: A

- ⑤ Factors of 43 are 1 and 43 only

$$\text{sum} = 1 + 43$$

$$= 44 \quad \text{Ans: B}$$

- ⑥ The set of prime numbers is infinite. This means there is no largest prime number, and primes continue indefinitely.

Ans: A

- ⑦ The greatest prime numbers less than 200,

197 - prime

193 - prime

199 - prime

191 - prime

Among these options, greatest prime number less than 200 is 199.

Ans: C

- ⑧ 1 is neither prime nor composite because it has only one positive divisor itself. It does not fit the definition of a composite number.
Ans: B
-

- ⑨ The smallest prime number is 2
→ The next smallest even number after 2 is 2
→ The smallest odd number is 1.
Sum: $2+2+1=5$
Ans: C
-

- ⑩ The value of $2367 + 3592 + 4572$ is
 10531 → ending number is odd so, the number is odd number.
Ans: B
-

⑪

$$7868 \times 78963 \times 4578$$

The product of last digits $8 \times 3 \times 8 = 192$,

So, 2 is a even number result is even.

Ans: B

⑫

Prime numbers between 100 and 200 are

101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157,
163, 167, 173, 179, 181, 191, 193, 197, and 199.

These are the 21 prime numbers included in
the set of numbers 100 to 200.

Ans: B

⑬

Prime numbers between 30 and 40 are
31 and 37.

their sum: $31 + 37$

$$= 68.$$

Ans: C

⑭ $a^2 - b^2 = (a+b)(a-b)$

Substitute $a-b=1$

So, $a^2 - b^2 = a+b$

Therefore, if $a^2 - b^2$ is a prime number, then $a-b=1$.

Ans: B

⑮ $(a+b)^2 = a^2 + 2ab + b^2$

$a=2, b=4$, Substitute in above equation.

$$(2+4)^2 = (2)^2 + 2 \times 2 \times 4 + (4)^2$$

$$6^2 = 4 + 16 + 16$$

$$36 = 36.$$

Sum of a, b are $2+4=6$

Ans: A.

⑯ Through options,

53 is a prime number

Sum of prime number digit

$$5+3=8 \text{ and product is}$$

$$5 \times 3 = 15.$$

Ans: C

(17)

$$2^k + 1$$

Substitute k value for 1st option 1, 2

$$2^1 + 1 = 3$$

$$2^2 + 1 = 5$$

Ans: A

ADVANCED LEVEL QUESTIONS

MULTIPLE CORRECT ANSWER TYPE:

(18)

A formal definition of an even number is an integer of the form $n = 2k$, where k is an integer.

An odd number is defined as an integer of the form $n = 2k + 1$

Ans: A and B.

(19)

through Options

13 and 19 are prime numbers and odd numbers.

Ans: B and D

(20)

Prime factors of 63 is

63 can be divisible by prime number 3

63 can be divisible by prime number 7

Ans: A and B.

STATEMENT TYPE:

(21)

Statement I - This statement is true. The number 2 is indeed the only even prime number. An even number greater than 2 cannot be prime because it would be divisible by 2.

Statement II: It clarifies that prime numbers greater than 2 cannot be even because being even implies divisibility by 2.

Ans: A

(22)

Statement I: is true because we can indeed write 15 as the sum of 3 prime numbers 3, 5 and 7.

Statement II: The sum of 3 times of prime number and 2 times another prime number is 59. 11 and 13.

$$\begin{aligned}\text{Here, } 3p + 2q &= 3 \times 11 + 2 \times 13 \\ &= 59.\end{aligned}$$

Ans: A

COMPREHENSION TYPE

COMPREHENSION - I

(23)

Option A: 20 are 1, 2, 4, 5, 10 and 20. The total no. of factors is 6. Which is even.

B: 6 are 1, 2, 3 and 6, The total number of factors 4, which is even.

C: The factors of 15 are 1, 3, 5 and 15 number of factors 4, which is even.

D: Both 1 and 3 have only 1 and 3 as factors, respectively. The no. of factors for both 1 and 3 is 2, which is even.

Ans: A, B, C and D.

24

The prime factorisation of 84 is $2 \times 2 \times 3 \times 7$
(or) $2^2 \times 3 \times 7$, where 2, 3 and 7 are the prime numbers.

Ans: A

25

To turn the number 4, 6 and 8 into a prime triplet, we need to subtract 1 from each number.

$$4 - 1 = 3 \text{ Prime number}$$

$$6 - 1 = 5 \text{ Prime number}$$

$$8 - 1 = 7 \text{ Prime number.}$$

So, subtraction 1 from each number gives us the prime triplet 3, 5 and 7.

Ans: B

INTEGER TYPE

26

If a is a prime number, the difference between 1 and its least factor would be $1 - a$.

(27) Let's find the two prime numbers p and q such that $p+q=110$, where q is obtained by reversing the digits of p .

(28)

(a) Greatest prime less than 42 is 41

Ans: 41

(b) (3,5) (5,7) (11,13) (17,19) (29,31) (41,43)
★ (47,49) are 7

Ans: 41 ★

(c) ★ Sum of prime numbers below 15 are 2, 3, 5, 7, 11, 13.

Sum: $2+3+5+7+11+13$

$=41$

Ans: 41

★

(d) ★ Two digit composite number lies between 10 and 99

Ans: 41

★