ORCHIDS® The International School

Practice Questions On Factors

Name: _____ Date: _____

Factors Worksheet Questions

Fill in the Blanks

1. Factors of 20: 1, 2, 4, ___, 10, 20

   Answer: 5

2. The GCF of 8 and 12 is ___

   Answer: 4

3. 30 = 2 × 3 × ___

   Answer: 5

4. A prime number has exactly ___ factors.

   Answer: 2

5. Factors of 16: 1, 2, 4, 8, ___

   Answer: 16

6. The GCF of 7 and 9 is ___

   Answer: 1 (co-prime)

7. $72 = 2^3 \times$ ___

   Answer: 3^2

8. Number of factors of 49 = ___

   Answer: 3 (1, 7, 49)

Match the Following

Number	Prime Factorisation
40	$2^3 \times 5$
60	$2^2 \times 3 \times 5$
90	$2 \times 3^2 \times 5$
80	$2^4 \times 5$

Answers:

40 → $2^3 \times 5$

60 → $2^2 \times 3 \times 5$

90 → $2 \times 3^2 \times 5$

80 → $2^4 \times 5$

True or False

1. 1 is a prime number.

   FALSE (1 has only one factor)

2. Every even number has 2 as a factor.

   TRUE

3. Factors of a number are always smaller than it.

   FALSE (the number itself is also its factor)

4. GCF of co-prime numbers is always 1.

   TRUE

5. 4 is a factor of 22.

   FALSE ✗ (22 ÷ 4 = 5.5, not exact)

6. 36 has an odd number of factors.

TRUE (36 is a perfect square → 9 factors)

Short Answer Questions

Q10: Find the factor pairs of 32.

32 = 1 × 32

32 = 2 × 16

32 = 4 × 8

Factor pairs: (1,32), (2,16), (4,8)

Q11: What is the GCF of two prime numbers?

Prime numbers only have factors: 1 and themselves.

The only common factor = 1

Answer: GCF of two prime numbers = 1

(They are always co-prime)

Challenging Factors Questions

HOTS Questions

Question 16: A number has exactly 4 factors. The sum of all its factors is 24. Find the number.

4-factor numbers: $p \times q$ or p^3 (two forms)

Try $p \times q$ type where sum = $1+p+q+pq = 24$:

$(1+p)(1+q) = 24$

Factor pairs of 24: (1,24),(2,12),(3,8),(4,6)

Try (3,8): $(1+p)=3 \rightarrow p=2$; $(1+q)=8 \rightarrow q=7$

Number = $2 \times 7 = 14$

Sum = 1+2+7+14 = 24

Answer: 14

Olympiad-Level Questions

Question 17: How many two-digit numbers have exactly 2 factors?

Numbers with exactly 2 factors = PRIME numbers!

Two-digit prime numbers:

11,13,17,19,23,29,31,37,41,43,47,

53,59,61,67,71,73,79,83,89,97

Count = 21 two-digit primes

Answer: 21 two-digit numbers have exactly 2 factors

Question 18: Find the smallest number that has exactly 12 factors.

12 factors means:

(a+1)(b+1)(c+1)... = 12

Possible forms:

$11+1 \rightarrow p^{11} \rightarrow 2^{11} = 2048$

$(5+1)(1+1) \rightarrow p^5 \times q \rightarrow 2^5 \times 3 = 96$

$(3+1)(2+1) \rightarrow p^3 \times q^2 \rightarrow 2^3 \times 3^2 = 72 \leftarrow$ smallest!

$(2+1)(1+1)(1+1) \rightarrow p^2 \times q \times r \rightarrow 2^2 \times 3 \times 5 = 60 \leftarrow$ even smaller!

(1+1)(1+1)(2+1) = same as above

Check 60: $60 = 2^2 \times 3 \times 5$

Factors = $(2+1)(1+1)(1+1) = 3 \times 2 \times 2 = 12$

Answer: 60 is the smallest number with 12 factors

Mixed Concept Questions

Question 19: The product of two numbers is 180 and their GCF is 6. Find the LCM.

GCF × LCM = Product of two numbers

6 × LCM = 180

LCM = 180/6 = 30

Answer: LCM = 30

Practice Test on Factors

1. List all factors of 30.

   Answer: 1,2,3,5,6,10,15,30

2. Is 7 a factor of 49?

   Answer: Yes (49÷7=7)

3. Find GCF of 8 and 12.

   Answer: 4

4. How many factors does 16 have?

   Answer: 5 (1,2,4,8,16)

5. Write prime factorisation of 18.

   Answer: 2×3^2

6. Find all common factors of 36 and 54.

   36 = $2^2 \times 3^2$, factors: 1,2,3,4,6,9,12,18,36

$54 = 2 \times 3^3$, factors: 1,2,3,6,9,18,27,54

Common: 1,2,3,6,9,18

7. How many factors does 120 have?

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

$(3+1)(1+1)(1+1) = 4 \times 2 \times 2 = 16$

8. Find GCF of 48, 64, and 80.

$48 = 2^4 \times 3$

$64 = 2^6$

$80 = 2^4 \times 5$

$GCF = 2^4 = 16$

9. A number has prime factorisation $2^2 \times 3 \times 7$.

How many factors does it have?

$(2+1)(1+1)(1+1) = 3 \times 2 \times 2 = 12$

10. Find the smallest number with factors 1,2,4,5,10,20.

Answer: 20 (the number itself)

Advanced Practice

11. Find the number of factors of 10000.

$10000 = 10^4 = (2 \times 5)^4 = 2^4 \times 5^4$

Factors = $(4+1)(4+1) = 25$

12. What is the GCF of $2^5 \times 3^2 \times 7$ and $2^3 \times 3^4 \times 5$?

$GCF = 2^3 \times 3^2 = 8 \times 9 = 72$