

CHAPTER

4

Types of Numbers

Vocabulary:

factors
factorisation
multiples
prime numbers
prime factors
composite numbers
square numbers
square root

Chapter Outcomes:

- Demonstrate an understanding of different types of numbers.



We use numbers every day. Almost all the things we do involve numbers. Numbers come in different types because they are used in different ways. Numbers are used to count how many of something there are. They are used to measure things, label things and order things. We use numbers at school, at home, when telling the time, checking our change, driving on the road or cooking a meal.

Getting Ready for Chapter 4

Skip count and write the missing numbers.

1. 2, 4, 6, _____, _____, _____
2. 6, 12, 18, _____, _____, _____
3. 8, 16, 24, _____, _____, _____

Write the missing number in each multiplication fact.

4. $6 \times \square = 72$
5. $\square \times 9 = 72$
6. $7 \times 4 = \square$

Write the missing number in each division fact.

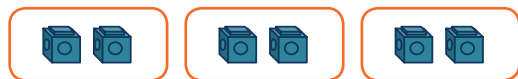
7. $\square \div 6 = 6$
8. $40 \div \square = 5$
9. $108 \div 9 = \square$

Odd and Even Numbers

Teaching Point 1:

You can find **odd** and **even** numbers by making groups of 2.

Put 6 cubes into groups of 2.



There are **no** blocks left. 6 is an **even number**.

Put 7 cubes into groups of 2.



There is **one** block left. 7 is an **odd number**.

Patterns in Even and Odd Numbers

Even numbers end with 0, 2, 4, 6 or 8.

Odd numbers end with 1, 3, 5, 7 or 9.

Activity 1:

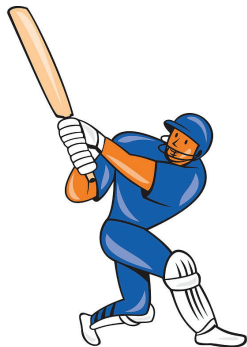
Write which of the following numbers are odd or even.

- | | | |
|--------|----------|--------|
| 1. 45 | 2. 23 | 3. 160 |
| 4. 238 | 5. 87 | 6. 249 |
| 7. 572 | 8. 1 354 | 9. 681 |

Solve the problems.

10. Write the odd numbers between 83 and 91.
11. How many even numbers are there that is less than 101?
12. If you add two even numbers, will the sum be odd or even?

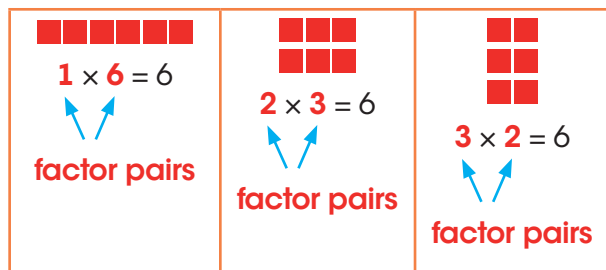
13. Is the sum of the 69 and 27 odd or even?
14. In the first innings of a cricket match the Parkites scored 364 runs, while the Islanders scored 274 runs. In the second innings the Parkites scored 210 and won the match. If the Islanders total runs for both innings was the closest even number to the Parkites total score, how much runs did the Islanders score in the second innings?



Factors

Teaching Point 1:

What are the factors of 6?



6 can be divided exactly by 1, 2, 3, and 6. So 1, 2, 3 and 6 are factors of 6.

Activity 1:

Write the factors of the following numbers.

- | | | |
|-------|-------|-------|
| 1. 8 | 2. 15 | 3. 4 |
| 4. 12 | 5. 14 | 6. 25 |
| 7. 9 | 8. 27 | 9. 36 |

- | | | |
|--------|--------|--------|
| 10. 16 | 11. 20 | 12. 42 |
| 13. 24 | 14. 32 | 15. 30 |

Teaching Point 2:

Find the common factors of 4 and 6?

The factors of 4 are 1, 2 and 4.

The factors of 6 are 1, 2, 3 and 6.

The **common factors** of 4 and 6 are 1 and 2.

A **common factor** is shared by two or more numbers.

Activity 2:

Find the common factors for each pair of numbers.

- | | | |
|------------|------------|------------|
| 1. 12, 16 | 2. 14, 21 | 3. 32, 12 |
| 4. 45, 96 | 5. 24, 27 | 6. 18, 30 |
| 7. 30, 40 | 8. 96, 48 | 9. 60, 54 |
| 10. 18, 72 | 11. 15, 45 | 12. 8, 12 |
| 13. 16, 48 | 14. 28, 70 | 15. 24, 40 |

Activity 3:

Solve the problems below.

- What factor pair does every number have?
- Which number between 1 and 20 has exactly 5 factors?

3. Which of the following numbers have the common factors 1, 3 and 10?

3, 10, 13, 30, 40, 60



4. Lisa wants to share 35 mangoes equally into heaps. She will make more than 1 heap but fewer than 10 heaps. How many heaps can Lisa make?
5. Miss Jones has 20 flowers. She wants to plant all the flowers in equal rows in her garden. What are the different ways Miss Jones can arrange the flowers.
6. What are the factor pairs for 48?
7. A grocery manager wants to display 45 cans of peas in an array. How many different ways can he display the cans?
8. An auditorium has rows of seats with 8 seats in each row. Alisha knows that there are at least 70 seats and fewer than 130 seats. How many seats can there be in the auditorium?
9. List all the factors of 24. Then list all the factors of 16. What factors do they share in common? Which common factor is the greatest number?
10. I am a factor of 40 and a multiple of 5. I am a 2-digit number greater than 10 but less than 30. What number am I?

Factors and Divisibility

Teaching Point 1:

A whole number is **divisible** by another number when the quotient is a whole number and the remainder is 0.

You can use divisibility rules to find factors of a number.

Divisibility Rules

A number is divisible by:

- 2 - If the number is even.
- 3 - If the sum of the digits is divisible by 3.
- 4 - If the last two digits are divisible by 4.
- 5 - If the last digit is 0 or 5.
- 6 - If the number is divisible by BOTH 2 and 3.
- 9 - If the sum of the digits is divisible by 9.
- 10 - If the last digit is 0.

Activity 1:

Use divisibility rules to solve the problems.

1. Write the numbers between 51 and 61 that are divisible by 2.
2. Which of the numbers below has 6 as a factor?
54 37 84 26

3. Brian has 126 sweets to distribute equally into 9 bags. Could he distribute them equally?

Multiples

Teaching Point 1:

To find a **multiple** of a number, multiply that number by any whole number.

What are the multiples of 2?

$2 \times 1 = 2$	$2 \times 5 = 10$	$2 \times 9 = 18$
$2 \times 2 = 4$	$2 \times 6 = 12$	$2 \times 10 = 20$
$2 \times 3 = 6$	$2 \times 7 = 14$	$2 \times 11 = 22$
$2 \times 4 = 8$	$2 \times 8 = 16$	$2 \times 12 = 24$

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24... are **multiples** of 2.

You can skip count to find **multiples** of numbers.

Is 12 a multiple of 4?

$$12 \div 4 = 3$$

12 can exactly be divided by 4. So 12 is a multiple of 4.

Activity 1:

Write the first 5 multiples of the following numbers.

- | | | |
|------|------|------|
| 1. 3 | 2. 5 | 3. 4 |
| 4. 6 | 5. 9 | 6. 7 |

- | | | |
|--------|--------|--------|
| 7. 2 | 8. 10 | 9. 8 |
| 10. 12 | 11. 14 | 12. 20 |

Activity 2:

Tell whether the first number is a multiple of the second number.

- | | | |
|-------------|------------|-------------|
| 1. 12, 3 | 2. 16, 5 | 3. 23, 4 |
| 4. 19, 6 | 5. 21, 9 | 6. 28, 7 |
| 7. 20, 2 | 8. 55, 10 | 9. 32, 8 |
| 10. 144, 12 | 11. 36, 14 | 12. 100, 20 |

Teaching Point 2:

What is a common multiple of 3 and 5?

The multiples of 3 are 3, 6, 9, 12, **15**, ...

The multiples of 5 are 5, 10, **15**, 20, 25, ...

A **common multiple** of 3 and 5 is 15.

A number that is a multiple of two or more numbers is a **common multiple**.

Solve the problems.

13. Is 6 a multiple of 18 or a factor?
14. Is 9 a multiple of 3 or a factor?

15. What number has 2 and 3 as factors and 12 and 18 as multiples?
16. What number has 10, 15 and 30 as multiples?
17. Javan bought some snacks for \$6 each. Maria bought some snacks for \$8 each. Both children spent the same amount of money on snacks. What is least amount of money they could have spent?

What are the factors of 1?

 $1 \times 1 = 1$

The number 1 has **only** 1 factor.

1 is neither a prime nor a composite number.

Prime and Composite Numbers

Teaching Point 1:

What are the factors of 5?

 $1 \times 5 = 5$

Prime numbers have only 1 array. So the factors of 5 are 1 and 5.

A **prime number** has only 2 different factors, 1 and the number itself. 5 is a prime number.

What are the factors of 4?

 $1 \times 4 = 4$

 $2 \times 2 = 4$

The factors of 4 are 1, 2 and 4.

A **composite number** has more than 2 different factors. 4 has 3 factors, so it is a composite number.

Activity 1:

Find the factors for each number. Write whether it is prime or composite.

- | | | |
|-------|-------|------|
| 1. 12 | 2. 2 | 3. 3 |
| 4. 15 | 5. 10 | 6. 9 |
| 7. 11 | 8. 21 | 9. 7 |

Eratosthenes, a Greek mathematician, who lived more than 2,200 years ago invented a method of finding prime numbers.

10. Use Eratosthenes method to find the prime numbers that are less than 100.

Step 1: Cross out 1. It is not a prime number.

Step 2: Circle the prime number 2. **Cross out** all other multiples of 2.

Step 3: Circle the next number that is not crossed out. This number is prime. **Cross out** all the multiples of this number.

Step 4: Repeat step 3.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

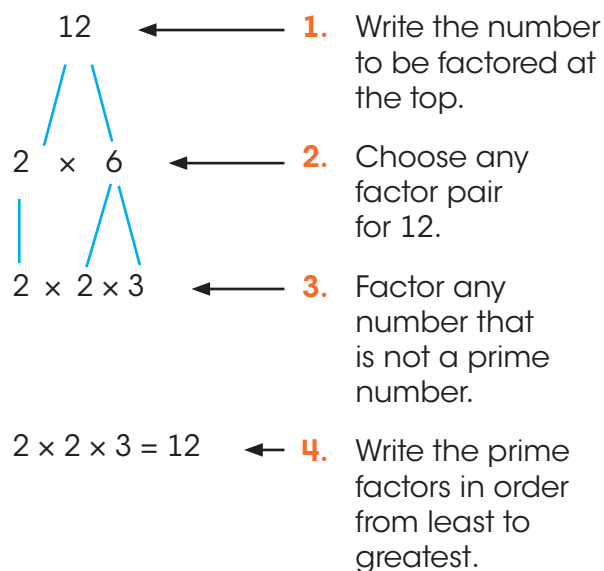
- 11.** Write all the prime numbers that are less than 100.
- 12.** Write all the composite numbers between 1 and 50.
- 13.** Why are the multiples of any number other than 1 not prime numbers?
- 14.** The sum of three prime numbers which are all less than 25 is also a prime number. What are the three prime numbers?
- 15.** The sum of three prime numbers is 12. What could the numbers be?
- 16.** I am thinking of a composite number between 20 and 30 that is not even, not prime, and not divisible by 3. What is the number?

Prime Factorisation

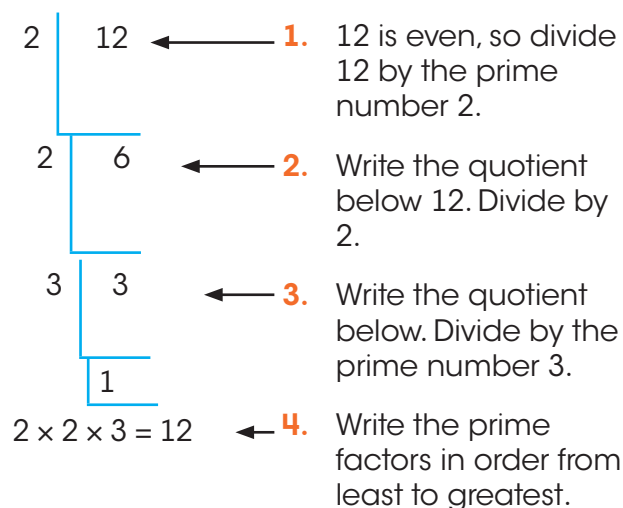
Teaching Point 1:

How can you find the prime factors of 12?

A **factor tree** can show the prime factorisation of a composite number.



You can use a **ladder diagram** to show the prime factorisation of a composite number.



Activity 1:

Write the prime factorisation of the following.

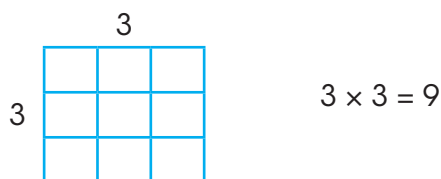
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|---------|---------|---------|
| 1. 8 | 2. 14 | 3. 15 |
| 4. 24 | 5. 16 | 6. 36 |
| 7. 45 | 8. 33 | 9. 130 |
| 10. 84 | 11. 35 | 12. 49 |
| 13. 108 | 14. 72 | 15. 96 |
| 16. 81 | 17. 132 | 18. 125 |

Square Numbers

Teaching Point 1:

How can you find the square of a whole number?

To square a whole number you multiply it by itself.



3×3 is called the square of 3. You can write 3×3 as 3^2 .

So, $3^2 = 9$.

The square of a whole number is called a **perfect square**. Since $9 = 3 \times 3$, 9 is a perfect square.

Activity 1:

Square the following numbers.

- | | | |
|--------|-------|-------|
| 1. 2 | 2. 3 | 3. 4 |
| 4. 7 | 5. 5 | 6. 8 |
| 7. 6 | 8. 10 | 9. 12 |
| 10. 11 | 11. 1 | 12. 9 |

Teaching Point 2:

Find the square root of 16?

Method 1: Recall multiplication facts.

Recall multiplication facts of 4.
 $4 \times 4 = 16$

4 is called the square root of 16. This can be written as $\sqrt{16} = 4$. We read this as "the square root of 16 is equal to 4".

Method 2: Use prime factorisation.

$$16 = 2 \times 2 \times 2 \times 2$$

$$16 = (2 \times 2) \times (2 \times 2)$$

$$2 \times 2 = 4$$

$$\sqrt{16} = 4$$

1. Write prime factors of 16.
2. Find pairs of similar factors.
3. Select one factor from each pair.

Activity 2:

Find the square root of each number.

- | | | |
|--------|-------|--------|
| 1. 36 | 2. 25 | 3. 144 |
| 4. 121 | 5. 49 | 6. 81 |
| 7. 100 | 8. 64 | 9. 16 |

-
10. Find the value of $3^2 + 5^2$.
11. $5^2 \times 4^2 - 10^2$
12. $\sqrt{100} + \sqrt{64}$
13. $\sqrt{81} + 5^2$
14. Which of the numbers below are square numbers?
13 16 23 36 49 55
15. How many squares with sides 10 cm long are needed to cover a square with a side length of 70 cm long without overlapping?
16. Find two consecutive numbers whose squares differ by 25.



17. The area of a square floor is 49 m^2 . What is the length of the sides of the floor?
18. The square root of 196 lies between which pair of numbers below?
- (a) 2 – 10
- (b) 4 – 8

(c) 9 – 13

(d) 10 – 15

19. What is the missing number in the pattern below?

1, 4, 9, __, 25, 36

Chapter Review

Express each number as a product of prime factors.

1. 42 2. 33 3. 24

Find the common factors of each pair of numbers.

4. 14 and 42 5. 15 and 60 6. 27 and 81

Write the first three common multiples of each pair of numbers.

7. 2 and 3 8. 4 and 5 9. 6 and 8

Find the lowest common multiple for the pairs of numbers below.

10. 3 and 8 11. 4 and 12 12. 3 and 4

Solve the problems below.

13. Four digits are shown below.

3	4	7	8
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- (a) Write the largest four-digit EVEN number.
- (b) Write the smallest four-digit ODD number.
14. What factor is paired with 6 to give 24?
15. Which of the numbers 19, 21, 23 and 25 has the most factors.
16. Which of the numbers 12, 21, 27, 36 and 45 are divisible by both 3 and 9?
17. What is the square root of 225?
18. Find three numbers you can multiply together to get 300.
19. You have 12 coloured squares of paper. What are the possible ways you can arrange the coloured squares to make a rectangle?
20. A number is between 58 and 68. It has prime factors of 2, 3 and 5. What is the number?



21. Jervon has football practice every 3 days and piano lessons every 7 days. If he has both lessons on the first day of the month, in how many days will he have both lessons on the same day again?
22. Miss Valentine's class is selling hot dogs to raise funds. They can buy hot dogs in packs of 12 and hot dog buns in bags of 10. They want to get the same number of hot dogs and buns with none left over.



What is the least number of packs of hot dogs and the least number of bags of buns they should buy? How many hot dogs will they be able to sell?

23. The sum of two factors of 32 is 12. What are the factors?
24. Which number below does not belong in the group? Explain.

30	42	15	24	39	49
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