

## DO NOW

- 1 Complete the first ten multiples of 5: 5, 10, 15, \_\_\_\_, \_\_\_\_, 30, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_
- 2 Find the first ten multiples of:  
**a** 4                      **b** 7                      **c** 8                      **d** 9                      **e** 11
- 3 Write the multiples of 6 between 23 and 55.
- 4 Write the multiples of 7 between 20 and 60.
- 5 Write the multiples of 9 that are less than 55.

## WALT list factors ( LCM and HCF) and multiples of a number

**Success Criteria** I know how to list factors and multiples of a number. I can calculate the lowest common factor and highest common multiple. I can use this knowledge to simplify fractions.

- a Write the first twelve multiples of 6.
- b Write the first twelve multiples of 5.
- c List the common multiples you have found.
- d What is the **lowest common multiple (LCM)** of 6 and 5?

*A common multiple of two numbers is a product they both have.*

- a 6, 12, 18, 24, **30**, 36, 42, 48, 54, **60**, 66, 72
- b 5, 10, 15, 20, 25, **30**, 35, 40, 45, 50, 55, **60**
- c Common multiples are 30, 60.
- d The LCM is 30.

Multiplying two numbers together gives a common multiple but not necessarily the *lowest* common multiple. For example, the LCM of 4 and 6 is 12, not 24. There is more on LCM in section F.

- 6 **a** Complete the multiples of 3 that are less than 50.  
3, 6, 9, \_\_\_\_, \_\_\_\_, \_\_\_\_, 21, 24, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, 42, \_\_\_\_, \_\_\_\_ .
  - b** Complete the multiples of 5 that are less than 50.  
5, 10, 15, \_\_\_\_, \_\_\_\_, \_\_\_\_, 35, 40, \_\_\_\_
  - c** List the common multiples of 3 and 5 that are less than 50: \_\_\_\_, 30, \_\_\_\_ .
  - d** The LCM of 3 and 5 is \_\_\_\_ .
- 7 **a** Write the first ten multiples of 3.  
**b** Write the first ten multiples of 4.  
**c** What is the LCM of 3 and 4?
  - 8 Write the first ten multiples of each number, then find the LCM of:  
**a** 7 and 5                      **b** 8 and 6                      **c** 9 and 6

*What does LCM stand for? !*

## ● EXAMPLE 3

Write the **factors** of 24.

*The factors of a product are the numbers that can multiply together to give the product.*

The factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24.

9 Complete the factors of 48: 1, 2, \_\_\_\_, \_\_\_\_, \_\_\_\_, 8, \_\_\_\_, 16, \_\_\_\_, 48

*Divide to find the factors.*

10 Find the factors of these numbers.

a 10

b 18

c 13

d 30

e 20

### EXAMPLE 4

a Write the factors of 27.

b Write the factors of 36.

c List the common factors of 27 and 36.

d What is the **highest common factor (HCF)** of 27 and 36?

*A common factor of two products is a factor they both have.*

a Factors of 27 are 1, 3, 9, 27.

b Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, 36.

c Common factors are 1, 3, 9.

d The highest common factor is 9.

The HCF is also referred to as the **greatest common divisor (GCD)**. There is more on HCF in section F.

11 a Complete the factors of 12: \_\_\_\_, 2, \_\_\_\_, 4, \_\_\_\_, \_\_\_\_

b Complete the factors of 36: 1, \_\_\_\_, \_\_\_\_, \_\_\_\_, 9, \_\_\_\_, 18, \_\_\_\_

c List the common factors of 12 and 36: \_\_\_\_, \_\_\_\_, 3, \_\_\_\_, \_\_\_\_, 12

d The HCF of 12 and 36 is \_\_\_\_.

*What does HCF stand for?*

12 a Write the factors of 30.

b Write the factors of 45.

c List the common factors of 30 and 45.

d What is the HCF of 30 and 45?

13 a Write the factors of 12.

b Write the factors of 18.

c What is the HCF of 12 and 18?

14 a Write the factors of 20.

b Write the factors of 30.

c What is the HCF of 20 and 30?

15 a List a pair of numbers that have a common multiple of 18.

b List another pair of numbers that have a common multiple of 18.

c Explain a method for determining all the pairs of numbers with 18 as a common multiple. List them.

d If 18 is the lowest common multiple (LCM), what are all the possible pairs of numbers?

e Explain why the lists for parts c and d are different.

16 Repeat question 15 using 30 as the common multiple.

17 a List a pair of numbers with a common factor of 8.

b List five pairs of numbers with a common factor of 8.

c Is it possible to list all the pairs of numbers with a common factor of 8? Explain.

d Is it possible to list all the pairs of numbers with 8 as the HCF? Explain.

**18** Two numbers have a HCF of 6 and a LCM of 90. Find the numbers.

**19** Find two numbers with:

**a** HCF of 4 and LCM of 60

**b** HCF of 8 and LCM of 48

**c** HCF of 3 and LCM of 180

**d** HCF of 90 and LCM of 5400

A **prime number** has exactly two factors, itself and 1. A number with more than two factors is **composite**.

**20** By finding the factors of the following numbers, decide which of them are prime numbers.

**a** 3

**b** 15

**c** 21

**d** 14

**e** 29

**f** 11

**g** 35

**h** 23

**i** 39

**j** 19

**21 a** Write the factors of 1.

**b** The number 1 is neither prime nor composite. Explain.

**c** Write the factors of 2.

**d** Is 2 prime or composite?

**e** Look at the prime numbers from question 20. What is special about 2?

**f** Copy and complete the following statement.

Except for 2, all prime numbers are \_\_\_\_\_.

**g** Why is 2 a unique prime number? How can you be sure?

**22** From the first 30 counting numbers, write all the composite numbers that have a pair of factors other than the number and 1.



## Investigation 5 Codes

Codes use large prime numbers.

- 1 Investigate the largest prime number.  
How many digits does it have?
- 2 Investigate why codes need prime numbers.

**Why are prime numbers important?**

**How are prime numbers used in real life?**

**What are the applications of prime numbers?**

**How can you tell a prime number?**

**Check your answers**

- 1** 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
- 2** **a** 4, 8, 12, 16, 20, 24, 28, 32, 36, 40  
**b** 7, 14, 21, 28, 35, 42, 49, 56, 63, 70  
**c** 8, 16, 24, 32, 40, 48, 56, 64, 72, 80  
**d** 9, 18, 27, 36, 45, 54, 63, 72, 81, 90  
**e** 11, 22, 33, 44, 55, 66, 77, 88, 99, 110
- 3** 24, 30, 36, 42, 48, 54
- 4** 21, 28, 35, 42, 49, 56
- 5** 9, 18, 27, 36, 45, 54
- 6** **a** 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48  
**b** 5, 10, 15, 20, 25, 30, 35, 40, 45  
**c** 15, 30, 45 **d** 15
- 7** **a** 3, 6, 9, 12, 15, 18, 21, 24, 27, 30  
**b** 4, 8, 12, 16, 20, 24, 28, 32, 36, 40  
**c** 12
- 8** **a** 5, 10, 15, 20, 25, 30, 35, 40, 45, 50  
7, 14, 21, 28, 35, 42, 49, 56, 63, 70, LCM = 35  
**b** 8, 16, 24, 32, 40, 48, 56, 64, 72, 80  
6, 12, 18, 24, 30, 36, 42, 48, 54, 60, LCM = 24  
**c** 9, 18, 27, 36, 45, 54, 63, 72, 81, 90  
6, 12, 18, 24, 30, 36, 42, 48, 54, 60, LCM = 18
- 9** 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
- 10** **a** 1, 2, 5, 10 **b** 1, 2, 3, 6, 9, 18 **c** 1, 13  
**d** 1, 2, 3, 5, 6, 10, 15, 30 **e** 1, 2, 4, 5, 10, 20
- 11** **a** 1, 2, 3, 4, 6, 12 **b** 1, 2, 3, 4, 6, 9, 12, 18, 36  
**c** 1, 2, 3, 4, 6, 12 **d** 12
- 12** **a** 1, 2, 3, 5, 6, 10, 15, 30 **b** 1, 3, 5, 9, 15, 45  
**c** 1, 3, 5, 15 **d** 15
- 13** **a** 1, 2, 3, 4, 6, 12 **b** 1, 2, 3, 6, 9, 18 **c** 6
- 14** **a** 1, 2, 4, 5, 10, 20 **b** 1, 2, 3, 5, 6, 10, 15, 30 **c** 10
- 15** **a-c** 1 and 18, 2 and 9, 2 and 6. They are any two of the factors of 18.  
**d** 1 and 18, 2 and 9 **e** Some pairs have a smaller LCM.
- 16** **a-c** Any two factors of 30 will have a common multiple of 30.  
**d** 1 and 30, 2 and 15, 3 and 10, 5 and 6  
**e** Some pairs have a smaller LCM.
- 17** **a-b** Any two multiples of 8. Examples: 8 and 16, 48 and 200  
**c-d** Not possible, because the number of multiples of 8 is unlimited
- 18** 6 and 90, 18 and 30
- 19** **a** 12 and 20, 4 and 60 **b** 16 and 24, 8 and 48  
**c** 3 and 180, 9 and 60, 12 and 45, 15 and 36  
**d** 90 and 5400, 270 and 1800, 360 and 1350, 450 and 1080
- 20** **a** Prime **b** Composite **c** Composite  
**d** Composite **e** Prime **f** Prime  
**g** Composite **h** Prime **i** Composite  
**j** Prime
- 21** **a** 1 **b** It has only one factor: itself.  
**c** 1, 2 **d** Prime  
**e** It is the only even prime.  
**f** Odd  
**g** It is even. Its factors are only itself and 1, unlike all other even numbers.
- 22** 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28, 30