CHAPTER 2

Factors and Multiples

What will you learn?

- Factors, Prime Factors and Highest Common Factor (HCF)
- Multiples, Common Multiples and Lowest Common Multiple (LCM)

Why study this chapter?

Factors and multiples are used in daily situations which involve numbers that are multiplied or numbers that are obtained from arrangement of rows or groups. Discuss daily situations that involve factors and multiples.

How would the knowledge of highest common factor help a construction worker determine the biggest size of square tiles required to fully cover the entire floor?

How does the knowledge of lowest common multiple help a musician understand the rhythm of music better?

Walking through Time

Eratosthenes

Eratosthenes (276 B.C. – 194 B.C.) was a Greek mathematician who introduced the Sieve of Eratosthenes which is used to filter out all prime numbers within a given range of numbers.

For more information:

https://goo.gl/WiMswX

Word Link

• factor	• *faktor*
• prime factor	• *faktor perdana*
• common factor	• *faktor sepunya*
• highest common factor/ greatest common divisor	• *faktor sepunya terbesar*
• multiple	• *gandaan*
• common multiple	• *gandaan sepunya*
• lowest common multiple	• *gandaan sepunya terkecil*
• prime factorisation	• *pemfaktoran perdana*

Open the folder downloaded from page vii for the audio of Word Link.

2.1 Factors, Prime Factors and Highest Common Factor (HCF)

What are factors?

LEARNING STANDARDS

Determine and list the factors of whole numbers, hence make generalisation about factors.

Exploration Activity 1

Aim: To identify the factors of a number.

1. Copy and complete the following boxes.

$12 \div 1 =$ ☐	$12 \div 2 =$ ☐	$12 \div 3 =$ ☐
$12 \div 4 =$ ☐	$12 \div 6 =$ ☐	$12 \div 12 =$ ☐

Thus, 12 can be divided completely by ☐

2. Explain the conclusion you arrive at.

From the results of Exploration Activity 1, it is found that a number can be divided completely by certain numbers.
For example, 12 can be **divided completely** by 1, 2, 3, 4, 6 and 12.
Therefore, numbers 1, 2, 3, 4, 6 and 12 are known as **factors** of 12.

Factors of a number are whole numbers that can divide the number completely.

Example 1

Determine whether
(a) 12 is a factor of 36.
(b) 9 is a factor of 30.

Solution

(a) $36 \div 12 = 3$
Thus, 12 is a factor of 36.

(b) 30 cannot be divided completely by 9.
Thus, 9 is not a factor of 30.

Example 2

List all the factors of 18.

Solution

$18 = 1 \times 18$ Thus, 1 and 18 are factors of 18.
$18 = 2 \times 9$ Thus, 2 and 9 are factors of 18.
$18 = 3 \times 6$ Thus, 3 and 6 are factors of 18.

Therefore, factors of 18 are 1, 2, 3, 6, 9 and 18.

SMART TIPS

1 is a factor of all numbers.

Self Practice 2.1a

1. Determine whether each of the following numbers is a factor of the number in the brackets.
   (a) 12 (40) (b) 5 (50) (c) 8 (24) (d) 6 (90)
   (e) 3 (45) (f) 14 (56) (g) 15 (60) (h) 18 (98)

2. List all the factors of each of the following numbers.
   (a) 15 (b) 32 (c) 40 (d) 48
   (e) 51 (f) 87 (g) 98 (h) 124

What are prime factors?

LEARNING STANDARDS

Determine and list the prime factors of a whole number, hence express the number in the form of prime factorisation.

Flashback

Which of the following numbers are prime numbers?

2, 9, 23, 41, 57, 69

Factors of 18 are 1, 2, 3, 6, 9 and 18. Among these factors, 2 and 3 are prime numbers. Thus, 2 and 3 are known as **prime factors** of 18.

A number can be expressed in the form of **prime factorisation** in which the number is written as the product of its prime factors.
For instance, $18 = 2 \times 3 \times 3$

Prime factorisation of a number can be done by **repeated division** by prime numbers or by using a **factor tree**.

Scan the QR Code or visit https://youtu.be/V4tiNgMPYsU to learn about the use of Eratosthenes method in determining prime numbers.

Example 3

Determine whether each of the following numbers is a prime factor of 84.
(a) 2 (b) 3 (c) 5

Solution

(a) $84 \div 2 = 42$
2 is a prime number. Thus, 2 is a prime factor of 84.

(b) $84 \div 3 = 28$
3 is a prime number. Thus, 3 is a prime factor of 84.

(c) $84 \div 5 = 16$ remainder 4
5 is a prime number but 84 cannot be divided completely by 5.
Thus, 5 is not a prime factor of 84.

Example 4

List all the prime factors of 72.

Solution

Factors of 72 are 1, (2), (3), 4, 6, 8, 9, 12, 18, 24, 36, 72

Prime numbers

1. List all the factors of 72.
2. Identify the prime numbers from the list.

Thus, prime factors of 72 are 2 and 3.

Example 5

Express 60 in the form of prime factorisation.

Solution

Method of repeated division

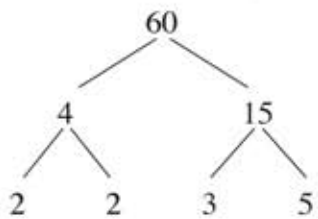
2	60
2	30
3	15
5	5
	1

1. Perform division repeatedly by dividing with the smallest prime number.
2. Division is continued until the quotient is 1.

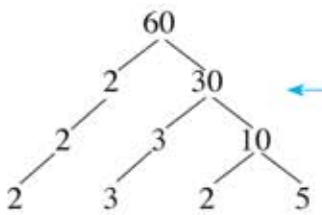
Scan the QR Code or visit https://youtu.be/eJLjA6uMm4g to learn more about prime factorisation of a number.

Thus, $60 = 2 \times 2 \times 3 \times 5$

Method of drawing a factor tree



or



60 is written as the product of two factors continuously until all the factors at the bottom level are prime factors.

Thus, $60 = 2 \times 2 \times 3 \times 5$

Self Practice 2.1b

1. Determine whether
   (a) 3, 5 and 7 are prime factors of 30.
   (b) 3, 5 and 9 are prime factors of 54.
2. List all the prime factors of each of the following numbers.
   (a) 36 (b) 48 (c) 58 (d) 99
3. Express each of the following numbers in the form of prime factorisation.
   (a) 42 (b) 96 (c) 120 (d) 135

What are common factors?

LEARNING STANDARDS

Explain and determine the common factors of whole numbers.

Exploration Activity 2

Pair

Aim: To explain and determine common factors.
Instruction: Perform the activity in pairs.

1. List all the factors of 18 and 24.
2. Are there numbers in the list which are factors of 18 as well as 24?
3. Discuss with your friends and explain the properties of these numbers in relation to 18 and 24.

From the results of Exploration Activity 2, it is found that 1, 2, 3 and 6 are factors of both 18 and 24. It means that both 18 and 24 can be divided completely by 1, 2, 3 and 6. Therefore, 1, 2, 3 and 6 are known as **common factors** of 18 and 24.

Example 6

Determine whether
(a) 6 is a common factor of 24 and 36
(b) 4 is a common factor of 30, 40 and 60
(c) 8 is a common factor of 16, 32, 48 and 72

Solution

(a) $24 \div 6 = 4$
$36 \div 6 = 6$
24 and 36 can be divided completely by 6.
Thus, 6 is a common factor of 24 and 36.

(b) $30 \div 4 = 7$ remainder 2
$40 \div 4 = 10$
$60 \div 4 = 15$
30 cannot be divided completely by 4.
Thus, 4 is not a common factor of 30, 40 and 60.

(c) $16 \div 8 = 2$
$32 \div 8 = 4$
$48 \div 8 = 6$
$72 \div 8 = 9$
16, 32, 48 and 72 can be divided completely by 8.
Thus, 8 is a common factor of 16, 32, 48 and 72.

Example 7

List all the common factors of 20, 44, 56 and 64.

SMART TIPS

1 is a common factor of all numbers.

Solution

Factors of 20 : (1), (2), (4), 5, 10, 20
Factors of 44 : (1), (2), (4), 11, 22, 44
Factors of 56 : (1), (2), (4), 7, 8, 14, 28, 56
Factors of 64 : (1), (2), (4), 8, 16, 32, 64

Thus, common factors of 20, 44, 56 and 64 are 1, 2 and 4.

Self Practice 2.1c

1. Determine whether each of the following numbers is a common factor of the list of numbers in the brackets.
   (a) 6 (12, 24, 42) (b) 8 (8, 32, 72) (c) 3 (12, 18, 20)
   (d) 12 (48, 96, 120, 144) (e) 7 (28, 35, 91, 105) (f) 9 (18, 36, 108, 119)

2. List all the common factors of each of the following lists of numbers.
   (a) 12, 30 (b) 24, 48 (c) 35, 105
   (d) 12, 84, 98 (e) 35, 90, 150 (f) 12, 72, 96
   (g) 42, 102, 144, 200 (h) 84, 132, 300, 360 (i) 110, 210, 360, 540

What is highest common factor (HCF)?

LEARNING STANDARDS
Determine the HCF of two and three whole numbers.

We have learnt that common factors of 20, 44, 56 and 64 are 1, 2 and 4. Among these common factors, 4 is the greatest number. Therefore, the number 4 is known as the **highest common factor (HCF)** of 20, 44, 56 and 64.

HCF can be determined by using the methods of
- listing the common factors
- repeated division
- prime factorisation

Example 8

Determine the highest common factor of
(a) 18 and 24 (b) 36, 60 and 72 (c) 48, 64 and 80

Solution

(a) **Method of listing the common factors**

Factors of 18 : (1), (2), (3), (6), 9, 18

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

Thus, the common factors of 18 and 24 are 1, 2, 3 and 6.
Therefore, the HCF of 18 and 24 is 6.

(b) **Method of repeated division**

2	36 , 60 , 72	
2	18 , 30 , 36	← Divide the given numbers by a common factor repeatedly. Then determine the HCF by multiplying all the divisors.
3	9 , 15 , 18	
	3 , 5 , 6	

Thus, the HCF of 36, 60 and 72 is $2 \times 2 \times 3 = 12$

(c) **Method of prime factorisation**

$48 = 2 \times 2 \times 2 \times 2 \times 3$
$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$ ← Find the prime factorisation of each given number. Then determine the HCF by multiplying all the common prime factors.
$80 = 2 \times 2 \times 2 \times 2 \times 5$

Thus, the HCF of 48, 64 and 80 is $2 \times 2 \times 2 \times 2 = 16$

Self Practice 2.1d

1. By using a suitable method, find the highest common factor of each of the following lists of numbers.
   (a) 24, 48 (b) 18, 54 (c) 36, 96 (d) 30, 72
   (e) 36, 90, 108 (f) 42, 54, 84 (g) 140, 256, 348 (h) 27, 45, 60

How do you solve problems?

MATHEMATICS APPLICATION TEST

LEARNING STANDARDS
Solve problems involving HCF.

The Boy Scouts of a school held a charity activity. A total of 252 shirts, 180 pairs of trousers and 108 pairs of socks were donated by members to an orphanage. All the items were divided equally in each pack. What would be the maximum number of packs that were prepared?

Solution

Understanding the problem	Devising a plan	Implementing the strategy	Doing reflection
252 shirts, 180 pairs of trousers and 108 pairs of socks were divided equally in each pack. Find the maximum number of packs that were prepared.	Find the HCF of 252, 180 and 108.	$252 = 2 \times 2 \times 3 \times 3 \times 7$ $180 = 2 \times 2 \times 3 \times 3 \times 5$ $108 = 2 \times 2 \times 3 \times 3 \times 3$ The HCF of 252, 180 and 108 is $2 \times 2 \times 3 \times 3 = 36$. The maximum number of packs that were prepared would be 36.	$252 \div 36 = 7$ $180 \div 36 = 5$ $108 \div 36 = 3$

Self Practice 2.1e

1. The Police Cadets in a school donated 60 sacks of rice, 78 bottles of cooking oil and 90 bottles of mineral water to some flood victims in a district. All the things were divided equally in each box for the flood victims. What would be the maximum number of boxes that were prepared?
2. At a *Hari Raya* party, Mak Minah prepared 45 pieces of *kuih koci*, 75 pieces of *kuih tako* and 90 pieces of curry puffs. She wished to serve all the food on some plates. What would be the maximum number of plates needed if all the food was distributed equally on all the plates?

Mastery Q 2.1

Open the folder downloaded from page vii for extra questions of Mastery Q 2.1.

1. Find the greatest number that is a factor of both 45 and 75.
2. Write the prime factorisation of 1 968 and 4 968. Hence, find the highest common factor of 1 968 and 4 968.

3. The highest common factor of n and 36 is 4. If n is less than 36, what are the possible values of n?
4. Three pieces of string have a length of 192 cm, 242 cm and 328 cm respectively. Aishah wishes to cut the strings so that every piece is cut into the same number of segments with no extra string left. What would be the maximum number of segments that each piece of string can be cut into?
5. Anita wishes to cut a piece of paper measuring 260 cm in length and 20 cm in width into several square pieces. What would be the measurement of the square pieces so that there is no paper left?

2.2 Multiples, Common Multiples and Lowest Common Multiple (LCM)

LEARNING STANDARDS

Explain and determine the common multiples of whole numbers.

What are common multiples?

Note that $9 \times 1 = 9$
$9 \times 2 = 18$
$9 \times 3 = 27$

The number 9 is multiplied by 1, 2, 3, ... to give the products of 9, 18, 27, ...
9, 18, 27, ... are known as **multiples** of 9.

Exploration Activity 3

Pair

Aim: To explain and determine common multiples.
Instruction: Perform the activity in pairs.

1. List the first five multiples of 6 and 8.
2. Are there numbers in the list which are multiples of 6 as well as 8?
3. Discuss with your friends and explain the properties of these numbers in relation to 6 and 8.

From the results of Exploration Activity 3, it is found that 24 is a multiple of 6 as well as 8. It means that 24 can be divided completely by 6 and 8. Therefore, the number 24 is known as a **common multiple** of 6 and 8.

Let's Discuss

How many common multiples of 6 and 8 can be written? Discuss with your friends.

Example 9

Determine whether
(a) 32 is a common multiple of 2 and 8.
(b) 60 is a common multiple of 5, 15 and 24.
(c) 72 is a common multiple of 8, 9, 18 and 24.

Solution

(a) $32 \div 2 = 16$
$32 \div 8 = 4$ ← 32 can be divided completely by 2 and 8.
Thus, 32 is a common multiple of 2 and 8.

(b) $60 \div 5 = 12$
$60 \div 15 = 4$
$60 \div 24 = 2$ remainder 12 ← 60 cannot be divided completely by 24.
Thus, 60 is not a common multiple of 5, 15 and 24.

(c) $72 \div 8 = 9$
$72 \div 9 = 8$
$72 \div 18 = 4$ ← 72 can be divided completely by 8, 9, 18 and 24.
$72 \div 24 = 3$
Thus, 72 is a common multiple of 8, 9, 18 and 24.

Exploration Activity 4

Group

Aim: To explore the relationship between the first common multiple and the subsequent common multiples.

Instruction:
- Perform the activity in groups of four.
- Open the folder downloaded from page vii.

1. Open the file *Common multiples.xls* with an electronic spreadsheet. The screen display shows a list of multiples of 3 (red) and a list of multiples of 5 (blue).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78
2	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130
3																										
4																										

2. Observe the lists of multiples displayed, then write the first common multiple of 3 and 5.
3. Write three subsequent common multiples of 3 and 5.
4. Explain the relationship between the first common multiple and the three subsequent common multiples.
5. Repeat Steps 2 to 4 by changing the number in the cells A1 and A2 respectively to the following numbers:
   (a) 6 and 8 (b) 4 and 10
6. Discuss with your friends and draw a conclusion about common multiples.

From the results of Exploration Activity 4, it is found that the first common multiple of 3 and 5 is 15 and all other common multiples of 3 and 5 are multiples of 15.

Example 10

List the first five common multiples of 2, 3 and 4.

Solution

Multiples of 2 : 2, 4, 6, 8, 10, (12), 14, ...
Multiples of 3 : 3, 6, 9, (12), 15, ...
Multiples of 4 : 4, 8, (12), 16, ...

Determine the first common multiple of 2, 3 and 4. Then determine the multiples of the first common multiple.

The first common multiple of 2, 3 and 4 is 12.
Thus, the first five common multiples of 2, 3 and 4 are 12, 24, 36, 48 and 60.

Self Practice 2.2a

1. Determine whether each of the following numbers is a common multiple of the list of numbers in the brackets.

(a) 72 (9, 12) (b) 168 (2, 9) (c) 360 (4, 6, 24)
(d) 2250 (2, 5, 9) (e) 9720 (4, 5, 10, 20) (f) 16416 (6, 9, 12, 24, 36)

2. List the first five common multiples of each of the following lists of numbers. (Use an electronic spreadsheet to help you)

(a) 2, 5 (b) 3, 5 (c) 18, 22 (d) 3, 5, 8
(e) 2, 3, 6, 8 (f) 4, 8, 12, 15 (g) 6, 15, 20, 24 (h) 4, 9, 12, 15, 18

What is lowest common multiple (LCM)?

LEARNING STANDARDS

Determine the LCM of two and three whole numbers.

We have learnt that the common multiples of 6 and 8 are 24, 48, 72, 96, ... Among these common multiples, the first common multiple, 24, is the least number. The number 24 is known as the **lowest common multiple (LCM)** of 6 and 8.

LCM can be determined by using the methods of
- listing the common multiples
- repeated division
- prime factorisation

Let's Discuss

Explain how you would use LCM to solve $\frac{1}{6} + \frac{1}{8}$.

Example 11

Determine the lowest common multiple of
(a) 2 and 3 (b) 3, 6 and 9 (c) 3, 8 and 12

Solution

(a) **Method of listing the common multiples**

Multiples of 2: 2, 4, (6), 8, 10, ...
Multiples of 3: 3, (6), 9, 12, ...
The lowest common multiple is 6.

Choose the lowest common multiple.

(b) **Method of repeated division**

3	3 , 6 , 9
2	1 , 2 , 3
3	1 , 1 , 3
	1 , 1 , 1

1. Divide the numbers repeatedly by a divisor that can divide completely at least one of the numbers.
2. Numbers that cannot be divided completely by the selected divisor are brought down for subsequent divisions.
3. Division is continued until all the quotients become 1.

Thus, LCM of 3, 6 and 9 is $3 \times 2 \times 3 = 18$.

(c) **Method of prime factorisation**

$3 = 3$
$8 = 2 \times 2 \times 2$
$12 = 2 \times 2 \times 3$
$2 \times 2 \times 2 \times 3$

Find the prime factorisation of each of the given numbers.

Thus, LCM of 3, 8 and 12 is $2 \times 2 \times 2 \times 3 = 24$.

Alternative Method

3, 8, (12) ← 1. Identify the greatest number.

12, 24, 36, … ← 2. List the multiples of the greatest number. 3. Determine the lowest multiple that can be divided completely by all the other given numbers.

24 can be divided completely by 3 and 8.

Thus, LCM of 3, 8 and 12 is 24.

Self Practice 2.2b

1. By using a suitable method, find the lowest common multiple of each of the following lists of numbers.
   (a) 16, 18 (b) 10, 15 (c) 6, 8 (d) 18, 60
   (e) 6, 15, 18 (f) 8, 14, 32 (g) 9, 12, 21 (h) 4, 15, 60

How do you solve problems?

LEARNING STANDARDS
Solve problems involving LCM.

MATHEMATICS APPLICATION TEST

Canned coffee is sold in 6 cans per box and canned tea is sold in 9 cans per box. Ainun wishes to buy the same number of canned coffee and canned tea for her sister's birthday party. What is the minimum number of boxes of each type of canned drinks she needs to buy?

Solution

Understanding the problem	Devising a plan	Implementing the strategy	Doing reflection
Number of cans of coffee = 6 cans per box Number of cans of tea = 9 cans per box Find the minimum number of boxes of each type of canned drinks Ainun needs to buy.	Find the LCM of 6 and 9 to determine the same number of cans. Use division to find the number of boxes of canned coffee and canned tea.	Multiples of 6: 6, 12, (18), 24, 30, ... Multiples of 9: 9, (18), 27, 36, 45, ... Thus, LCM of 6 and 9 = 18 Number of boxes of canned coffee = 18 ÷ 6 = 3 Number of boxes of canned tea = 18 ÷ 9 = 2 Therefore, the minimum number of boxes Ainun needs to buy is 3 boxes of canned coffee and 2 boxes of canned tea.	Number of canned coffee = 3 × 6 = 18 Number of canned tea = 2 × 9 = 18

Self Practice 2.2c

1. A neon light blinks every 9 seconds whereas another neon light blinks every 12 seconds. If both the lights blink together when the switch is on, after how many seconds will both the neon lights blink together again?
2. Vijaya wishes to pack some souvenirs consisting of a key chain and a refrigerator magnet in each pack for her friends. Key chains are sold in 10 pieces per packet whereas refrigerator magnets are sold in 6 pieces per packet. What is the minimum number of key chains Vijaya has to buy so that the number of refrigerator magnets she buys can be packed exactly with all the key chains?

Mastery Q 2.2

Open the folder downloaded from page vii for extra questions of Mastery Q 2.2.

1. Find the smallest number that can be divided completely by 8 and 20.
2. The lowest common multiple of n and 6 is 72. Find the value of n.
3. Sharif likes exercising. He goes hill-climbing every 12 days and goes swimming every 8 days. If he goes hill-climbing and swimming today, how many days later will he go hill-climbing and swimming on the same day again?
4. Nurul, Hui Ling and Gopal were each given a piece of ribbon of the same length. They cut their own ribbons into several pieces of the same length. The pieces of ribbon cut by Nurul, Hui Ling and Gopal measured 15 cm, 25 cm and 30 cm long respectively. All the ribbons were cut and there were no remainders left. What was the shortest possible length of the ribbon given to them?

SUMMARY

Factors

Factors of 12:
1, 2, 3, 4, 6, 12
Factors of 18:
1, 2, 3, 6, 9, 18

↓

Common factors

Common factors of 12 and 18:
1, 2, 3, 6

↓

Highest common factor

Highest common factor
of 12 and 18:
6

Multiples

Multiples of 6:
6, 12, 18, 24, 30, …
Multiples of 8:
8, 16, 24, 32, 40, …

↓

Common multiples

Common multiples of 6 and 8:
24, 48, 72, 96, 120, …

↓

Lowest common multiple

Lowest common multiple
of 6 and 8:
24

At the end of this chapter, I can...	Very good	Work harder
determine and list the factors of a whole number, and subsequently make a generalisation about factors.		
determine and list the prime factors of a whole number and subsequently express the number in the form of prime factorisation.		
explain and determine common factors of a whole number.		
determine the HCF of two or three whole numbers.		
solve problems involving HCF.		
explain and determine common multiples of a whole number.		
determine the LCM of two or three whole numbers.		
solve problems involving LCM.		

Let's PRACTISE

Test Yourself

1. Find the LCM of 2, 3, 4, 5 and 6.
2. Find the HCF of 36, 42, 56, 72 and 96.

Self Mastery

3. A number can be divided completely by 12 and 30. What is the smallest value of the number?
4. The HCF of m and 54 is 6. Find the largest value of m such that the value of m is less than 54.
5. The LCM of 36, 56 and n is 1512. What is the smallest value of n?

Challenge Yourself

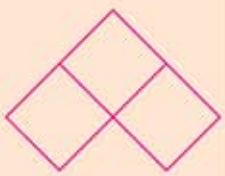
6. Explain with examples how the LCM of two numbers is the same as the product of the two numbers.
7. The LCM of two numbers is 60 and the HCF of the two numbers is 6. Find the two possible numbers.
8. A clock is set to ring every 15 minutes whereas another clock is set to ring every 25 minutes. If both the clocks ring together at 4:00 p.m., find the time at which both clocks will subsequently ring together again.
9. A room has a measurement of 7.5 m × 9.6 m. If Encik Zaki wishes to lay square tiles on the floor of the room, what is the biggest size, in cm, of the tiles so that the tiles will fully cover the entire floor?
10. A cafeteria serves groundnut cakes every 4 days and burgers every 6 days. If groundnut cakes and burgers are served on Monday, on which day will both types of food be served on the same day again at the cafeteria?
11. Ai Lin wants to produce a history scrapbook using 24 photographs and 42 newspaper cuttings. She wishes to use all the photographs and newspaper cuttings such that every page of the scrapbook contains the same number of photographs and newspaper cuttings.
    (a) What is the maximum number of pages she can have for the scrapbook?
    (b) For each page of the scrapbook, how many photographs and newspaper cuttings will there be?

ASSIGNMENT

A bakery received an order for 7 similar cakes. The customer requested that the cakes be cut and packed equally in 12 similar small boxes with each box containing two slices of cake. The shopkeeper sought help through social media. Write a report to explain how you would use the knowledge of factors and multiples to help the shopkeeper solve the problem.

Exploring MATHEMATICS

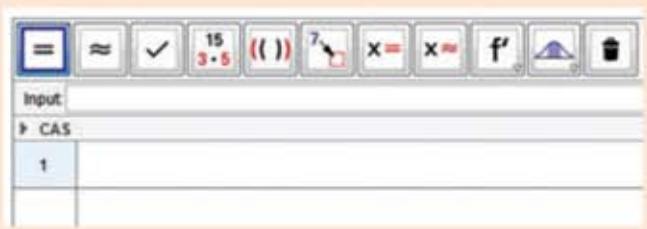
A The diagram shows three identical adjoining squares. Considering the common multiples of 3 and 4, explain how you would divide the three squares into four identical parts.



Open the file Exploring Chapter 2.ggb from the folder downloaded from page vii for help if needed.

B *GeoGebra* can help you to determine the LCM, HCF, prime factorisation, listing of factors and others.

1. Open the software of *GeoGebra*.
2. Click *View* → *CAS*. The following screen is displayed.
3. Type each of the following commands into cell 1 to cell 7 and press Enter in the CAS view.
   (i) PrimeFactors[60]
   (ii) DivisorsList[60]
   (iii) GCD[12,56]
   (iv) LCM[12,56]
   (v) *A*:={8,12,18,20}
   (vi) GCD[A]
   (vii) LCM[A]



4. Explain what can be observed.
5. Try other numbers.