●●○○○ **Level 2 · Mathematics** **M2.3**

Times tables and sharing

Equal groups, the times tables, and sharing things fairly.

Learn the times tables by seeing equal groups. Then use them to share, to find what is left over, and to work with bigger numbers.

YOU ARE READY FOR THIS BOOK IF

You can count in 2s, 5s and 10s up to 50.

One step up	M3.2 Long multiplication and division
This book	**M2.3 Times tables and sharing**
One step down	M1.3 Adding and taking away

Contents

M2.3.1 Equal groups

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M2.3.5 The 6, 7 and 9 times tables

M2.3.6 Times and divide facts together

M2.3.7 Remainders

M2.3.8 Times and divide with bigger numbers

Key words, A to Z

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M2.3.1 CHAPTER 1

Equal groups

> **There are 4 plates with 3 beans on each plate. How many beans is that?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** 7 beans, because 4 + 3 = 7.
- ☐ **B** 12 beans, because it is 4 groups of 3.
- ☐ **C** 3 beans, because each plate has 3.

IF THIS FEELS HARD, READ THIS FIRST

- Level 1, Adding and taking away, M1.3.4, coming soon. Adding the same number again and again leads to times tables.

BY THE END YOU CAN

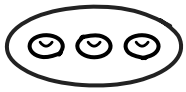
- Write 4 groups of 3 as 4 × 3
- Show 4 × 3 as rows and columns of dots

Mei puts 3 beans on a plate. She does this for 4 plates.

Every plate has the same number of beans. The plates are **equal groups**. Equal groups all have the same number of things.

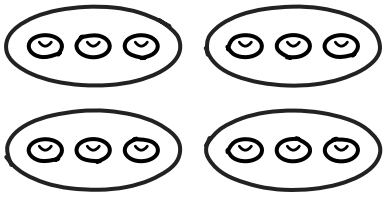
DRAW IT FIRST

Write 4 groups of 3



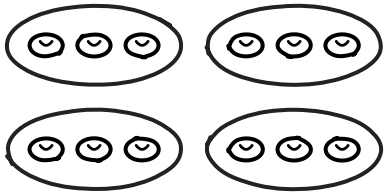
1 group of 3

1 Draw one group of 3 dots or beans.



4 groups of 3

2 Draw 3 more groups the same.

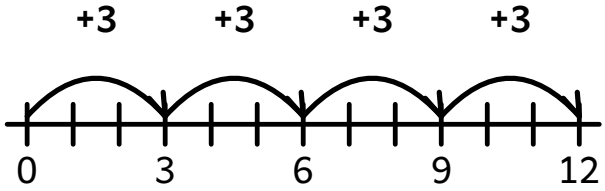


4 × 3 = 12

3 Write it as 4 × 3 = 12. Say "4 times 3 is 12".

The word **times** means "groups of". We write it as ×. So 4 × 3 means 4 groups of 3.

To find the answer, add the groups. 3 + 3 + 3 + 3 = 12.



Each hop is one group of 3. Four hops land on 12, so 4 × 3 = 12.

WORKED EXAMPLE

Write 3 groups of 5 beans as a times sum. Find the answer.

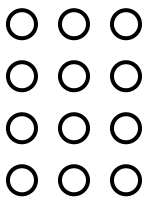
1. Count the groups. There are 3.
2. Count the beans in one group. There are 5.
3. Write the groups first, then the beans in each: 3 × 5.
4. Add the groups: 5 + 5 + 5 = 15.

Answer: 3 × 5 = 15

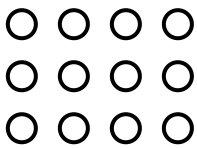
Now line the groups up under each other. Each group is a **row**. A row goes across.

Things set out in equal rows are an ***array***. A line going down is a column. This array has 4 rows and 3 columns.

4 × 3 = 12

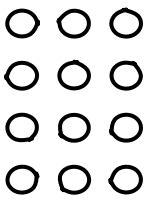


3 × 4 = 12



Turn the array on its side. The dots stay the same. So 4 × 3 and 3 × 4 are both 12.

SEE IT THREE WAYS

With things	As a picture	In symbols
Put 12 stones in 4 rows. Put 3 stones in each row.		**4 × 3 = 12. Also 3 × 4 = 12.**

TRY IT

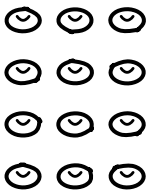
Make an array of beans

You need: 12 beans, or 12 small stones, a flat table.

1. Put 3 beans in a line. That is one row.
2. Make 3 more rows the same, one under the other.
3. Count all the beans.
4. Now walk to the side of the table. Look at the beans again.

What you will see: From the front you see 4 rows of 3. From the side you see 3 rows of 4. It is 12 beans both ways.

If you cannot try it, this is what happens.

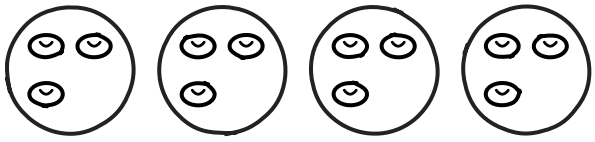


4 rows of 3

4 + 3 = 7



4 × 3 = 12



Seven beans is a small pile. Four groups of 3 is a bigger pile.

A WRONG IDEA MANY PEOPLE HAVE

~~4 × 3 means 4 + 3.~~

Why it feels right: The numbers are the same. And the × sign looks like a + sign turned on its side.

The test that breaks it: Put 3 beans on each of 4 plates. Count all the beans. Is it 7?

What is true: 4 × 3 means 4 groups of 3, which is 12. Only 4 + 3 is 7.

KEY WORDS

equal groups
groups that all have the same number of things.

times
groups of. 4 × 3 is read "4 times 3".

row
a line of things going across.

array
things set out in equal rows.

BACK TO YOUR GUESS

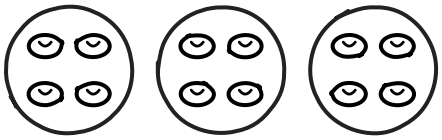
The answer is B: 12 beans, because it is 4 groups of 3.

There are 4 equal groups of 3. Add them: 3 + 3 + 3 + 3 = 12. We write this as 4 × 3 = 12.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Look at the picture. Which sum tells the story?



A 3 × 4 = 12

B 3 + 4 = 7

C 3 × 3 = 9

Answer at the back of the book.

2. Kofi has 5 bowls with 3 stones in each bowl. How many stones is that?

A 8 stones

B 3 stones

C 15 stones

Answer at the back of the book.

3. Mei makes 2 rows of 6 dots. Tariq makes 6 rows of 2 dots. Who has more dots?

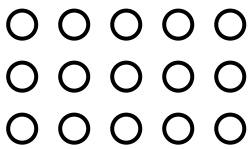
A Mei

B Tariq

C They have the same number.

Answer at the back of the book.

4. Look at the picture. Write the array as a times sum.



Answer at the back of the book.

5. Draw 5 groups of 2 dots. Write the times sum. How many dots are there?

Answer at the back of the book.

6. Look at Ana's seeds. How many columns does the array have?

Ana's seeds



A 2 columns

B 6 columns

C 12 columns

Answer at the back of the book.

7. Which number sentence gives the same total as 5 × 2?

A 2 × 5 = 10

B 5 + 2 = 7

C 5 × 5 = 25

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

4 × 3 means 4 groups of 3. Add them: 3 + 3 + 3 + 3 = 12. An array sets the groups out in rows. 4 × 3 and 3 × 4 are both 12.

Draw: 12 dots in 4 rows of 3. Write 4 × 3 = 12 under them. Turn the page and write 3 × 4 = 12.

M2.3.2 CHAPTER 2

The 2, 5 and 10 times tables

The answers in the 5 times table end in 5 or 0. Why?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** It is luck. There is no reason.
- ☐ **B** Each step adds 5. Two steps add 10, so the last digit comes back.
- ☐ **C** Because 5 is a small number.

IF THIS FEELS HARD, READ THIS FIRST

- Level 1, Numbers to 100, M1.2.4, coming soon. Count in 2s, 5s and 10s first. Then the tables come quickly.

BY THE END YOU CAN

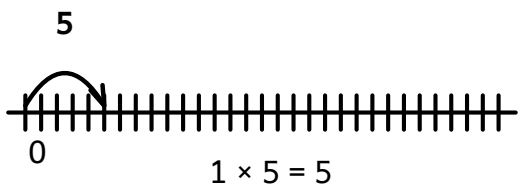
- Say the 2, 5 and 10 times tables
- Spot the pattern in the last digits of each table

A **times table** is a list of answers. Each answer is for one more group of the same size.

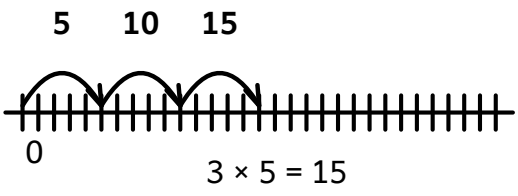
The 5 times table starts 1 × 5, 2 × 5, 3 × 5. You get each answer by counting in 5s.

DRAW IT FIRST

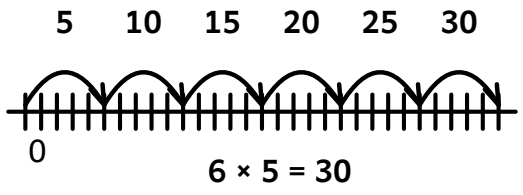
Count in 5s along a line



1 Start at 0. Hop 5. You land on 5. That is 1 × 5.

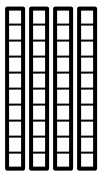


2 Hop 5 again, twice more. You land on 15. That is 3 × 5.



3 Keep going. Six hops of 5 land on 30. That is 6 × 5.

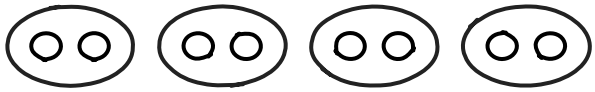
The 10 times table counts in 10s. Each answer is a number of tens. 4 × 10 is 4 tens, which is 40.



4 × 10 = 40

Each rod is one ten. 4 rods make 40.

The 2 times table counts in 2s. Each answer is a double. 4 × 2 is 4 + 4, which is 8.



4 × 2 = 8

Each pair is a group of 2. Four pairs make 8.

× 2	× 5	× 10
2	5	10
4	10	20
6	15	30
8	20	40
10	25	50
12	30	60
14	35	70
16	40	80
18	45	90
20	50	100

The three tables side by side. Look down each column.

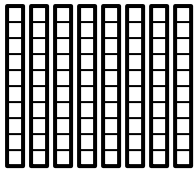
Now look at only the last **digit** of each answer. A digit is one of the figures 0 to 9.

2s	2	4	6	8	0	2	4	6	8	0
5s	5	0	5	0	5	0	5	0	5	0
10s	0	0	0	0	0	0	0	0	0	0

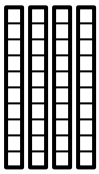
The last digits repeat. They never stop repeating.

The 2s end in 2, 4, 6, 8 or 0. These are **even** numbers. An even number shares into 2 equal groups with none left.

The 5s end in 5, then 0, then 5, then 0. The 10s all end in 0.



8 × 10 = 80



8 × 5 = 40

Take half of the rods. 4 rods are 40, so 8 × 5 = 40.

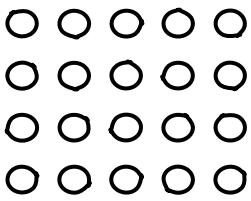
WORKED EXAMPLE

Find 8 × 5 without counting in 5s.

1. The 5 times table is half of the 10 times table.
2. Find 8 × 10. That is 8 tens, which is 80.
3. Take half of 80. Half of 80 is 40.

Answer: 8 × 5 = 40

SEE IT THREE WAYS

With things	**As a picture**	**In symbols**
Put 20 stones in 4 rows of 5. Count along the rows in 5s.		**4 × 5 = 20. Count: 5, 10, 15, 20.**

TRY IT

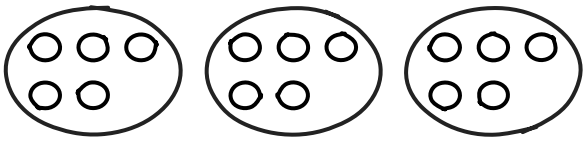
Count in 5s with stones

You need: 15 small stones, or beans, a flat table.

1. Put 5 stones in a pile. Say "5".
2. Make a second pile of 5. Say the total so far, "10".
3. Make a third pile of 5. Say the total, "15".
4. Look at the last digit of each number you said.

What you will see: You said 5, 10, 15. The last digits go 5, 0, 5. The next is 20. The last digit goes back to 0.

If you cannot try it, this is what happens.



5 10 15

A WRONG IDEA MANY PEOPLE HAVE

~~**The answers in the 5 times table all end in 5.**~~

Why it feels right: The first answers are 5, 15 and 25. Many of them do end in 5.

The test that breaks it: Count in 5s with stones: 5, 10, 15, 20. Look at the last digit of each number.

What is true: They end in 5, then 0, then 5, then 0. 4 × 5 = 20 ends in 0.

KEY WORDS

times table
a list of answers for more and more equal groups.

digit
one of the figures 0 to 9. In 35, the last digit is 5.

even
a number that shares into 2 equal groups with none left.

BACK TO YOUR GUESS

The answer is B: Each step adds 5. Two steps add 10, so the last digit comes back.

Each step adds 5. Two steps add 10, which does not change the last digit. So the last digits go 5, 0, 5, 0.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Which number is not in the 5 times table?

   A 35

   B 40

   C 52

   Answer at the back of the book.

2. Write the answers to 6 × 2, 6 × 5 and 6 × 10.

   Answer at the back of the book.

3. **From an earlier chapter**

   Ravi has 4 bags with 5 stones in each bag. Which sum tells how many stones?

   A 4 + 5 = 9

   B 4 × 5 = 20

   Answer at the back of the book.

4. Tariq says 45 is in the 2 times table. It ends in 5. Is he right?

   A Yes. 45 is in the 2 times table.

   B Yes. 4 is even, so 45 is even.

   C No. Those answers end in 0, 2, 4, 6 or 8.

   Answer at the back of the book.

5. Joseph has 9 pairs of sandals. How many sandals is that? Use the 2 times table.

   Answer at the back of the book.

6. What is 7 × 5?

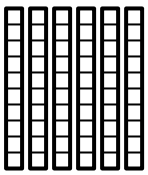
   A 12

   B 30

   C 35

   Answer at the back of the book.

7. Look at the rods. Each rod is 10. What is the total?



rods of ten

   A 60

   B 16

   C 6

   Answer at the back of the book.

8. Think of 5, 10, 15 and 20. Which list shows the last digit of each?

   A 5, 5, 5, 5

   B 5, 0, 5, 0

   C 5, 1, 1, 2

   Answer at the back of the book.

9. Which sentence is true for every answer in the 2 times table?

A It always ends in 2.

B It always ends in 0 or 5.

C It is always even.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

The 2 times table gives even numbers. The 5 times table ends in 5, 0, 5, 0. The 10 times table always ends in 0. Count in 2s, 5s or 10s to find an answer.

Draw: Write 5, 10, 15, 20, 25, 30 along a line. Circle the last digit of each number.

M2.3.3 CHAPTER 3

Sharing and grouping

> **I have 12 beans for 3 friends. How many beans does each friend get?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** 9 beans, because 12 take away 3.
- ☐ **B** 4 beans, because 4 + 4 + 4 = 12.
- ☐ **C** 36 beans, because 12 × 3.

IF THIS FEELS HARD, READ THIS FIRST

- Level 1, Fair shares and halves, M1.4.1, coming soon. Share things fairly, one at a time, before you write ÷.

BY THE END YOU CAN

- Share 12 things equally and write 12 ÷ 3 = 4
- Find how many groups of 4 are in 20

Amina has 12 beans. She wants to share them fairly with 2 friends. That makes 3 people in all.

She gives one bean to each person in turn. She keeps going until none are left. This is **sharing**.

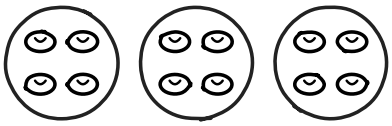
DRAW IT FIRST

Share 12 beans between 3 people



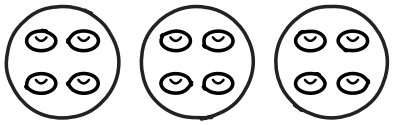
12 beans

1 Start with 12 beans in a pile.



4 each

2 Deal them out, one at a time, to 3 people. Each person gets 4.



12 ÷ 3 = 4

3 Write it as 12 ÷ 3 = 4. Say "12 divided by 3 is 4".

The sign ÷ means **divide**. To divide is to split into equal groups.

Division and times go together. 4 × 3 = 12, so 12 ÷ 3 = 4.

3 rows of 4



3 × 4 = 12

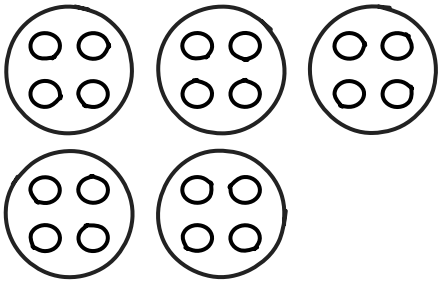
12 ÷ 3 = 4

Times puts the rows together. Divide splits the 12 back into 3 rows.

There is a second way to divide. Kofi has 20 stones. He puts them in groups of 4. How many groups can he make?

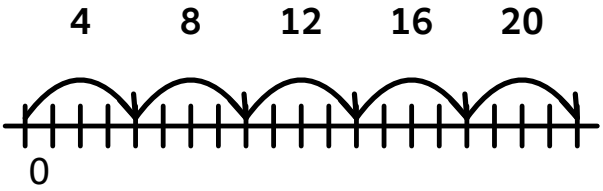
Here you do not ask how many go in each group. The size of the group is 4 already. You ask how many groups there are. This is **grouping**.

20 stones in groups of 4



20 stones make 5 groups of 4.

You can count the groups with hops. Hop 4 each time from 0. Stop at 20. Count the hops.



Five hops of 4 reach 20. So 20 ÷ 4 = 5.

WORKED EXAMPLE

How many groups of 4 are in 20?

1. Count in 4s until you reach 20: 4, 8, 12, 16, 20.
2. You said 5 numbers. So there are 5 groups.
3. Check by times: 5 × 4 = 20.

Answer: 5 groups

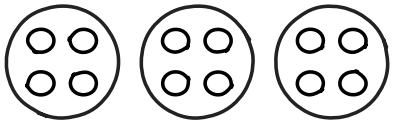
Sharing asks how many go in each group. Grouping asks how many groups. Both use the ÷ sign.

SEE IT THREE WAYS

With things

Put 12 stones in *a* pile. Deal them out, one *at a* time, to 3 people.

As *a* picture



4 stones each

In symbols

12 ÷ 3 = 4. Each person gets 4.

TRY IT

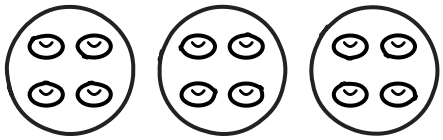
Share, then group, 12 beans

You need: 12 beans, or 12 small stones, 3 pieces of paper.

1. Put 12 beans in *a* pile. Put the 3 pieces of paper in *a* row.
2. Sharing: deal the beans, one *at a* time, onto the papers. Count one paper.
3. Now push all 12 beans back together.
4. Grouping: make groups of 3 beans. Count how many groups you make.

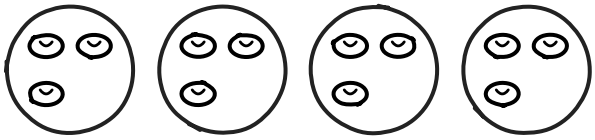
What you will see: Sharing gives 4 beans on each paper. Grouping gives 4 groups of 3. The number 4 comes up both times.

If you cannot try it, this is what happens.

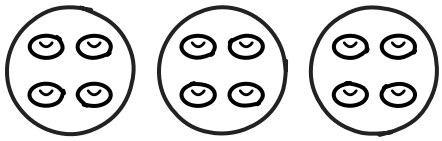


4 4 4

Shared by 4: 3 each



Groups of 4: 3 groups



Both ways give 3. The 3 means beans each in one, and groups in the other.

A WRONG IDEA MANY PEOPLE HAVE

~~Sharing and grouping give different answers.~~

Why it feels right: The two questions sound different. One asks how many in each, and one asks how many groups.

The test that breaks it: Take 12 beans. Share them between 4 people and count one share. Then make groups of 4 and count the groups.

What is true: Both give 3. It is 12 ÷ 4 = 3 either way. The 3 means something different each time.

KEY WORDS

sharing
dealing things out equally, one at a time.

grouping
finding how many groups of one size you can make.

divide
to split into equal groups. The sign is ÷.

BACK TO YOUR GUESS

The answer is B: 4 beans, because 4 + 4 + 4 = 12.

Give one bean to each friend in turn, until none are left. Each friend gets 4. We write 12 ÷ 3 = 4.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Share 15 stones between 3 friends. How many stones does each friend get?

   A 12 stones

   B 3 stones

   C 5 stones

   Answer at the back of the book.

2. Tariq has 28 stones. He puts them in groups of 4. How many groups does he make?

   Answer at the back of the book.

3. **From an earlier chapter**

   Mei shares 40 beans between 10 friends. How many beans does each friend get?

   Answer at the back of the book.

4. Share 20 beans between 5 friends. Then put 20 beans in groups of 5. Do you get the same answer?

   A Yes. Both give 4.

   B No. Sharing gives 4 and grouping gives 5.

   C No. Sharing gives 5 and grouping gives 4.

   Answer at the back of the book.

5. Write the sum for 18 stones shared between 3 friends. Then find the answer.

   Answer at the back of the book.

6. Kofi has 24 stones. He puts them in groups of 6. How many groups?

   A 6 groups

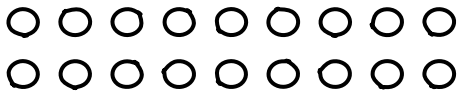
   B 18 groups

   C 4 groups

   Answer at the back of the book.

7. Three friends share this pile. Which sum shows the sharing?

   pile of stones

   A 18 − 3 = 15

   B 18 ÷ 3 = 6

   C 3 × 6 = 18

   Answer at the back of the book.

8. Amina shares 12 beans between 3 friends. 12 ÷ 3 = 4. What does the 4 tell you?

   A Each friend gets 4 beans.

   B 4 friends share the beans.

   C 4 beans are left over.

   Answer at the back of the book.

9. Which sum helps you find 24 ÷ 4?

   A 4 × 24 = 96

   B 24 − 4 = 20

   C 6 × 4 = 24

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Sharing: deal out one at a time. 12 ÷ 3 = 4 means 4 each.
Grouping: how many groups of 4 are in 20? Count in 4s. That is 5.

Draw: 12 dots in 3 groups of 4. Write 12 ÷ 3 = 4. Then draw 5 hops of 4 from 0 to 20.

M2.3.4 CHAPTER 4

The 3, 4 and 8 times tables

> **I know my 4 times table. How can that help me with the 8 times table?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Add 4 to each answer.
- ☐ **B** Double each answer.
- ☐ **C** Take half of each answer.

IF THIS FEELS HARD, READ THIS FIRST

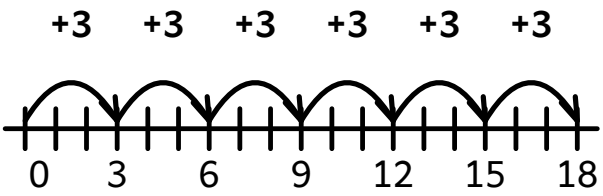
- Level 1, Adding and taking away, M1.3.4, coming soon. This chapter doubles numbers again and again.

BY THE END YOU CAN

- Say the 3, 4 and 8 times tables
- Get the 8 times table by doubling the 4 times table

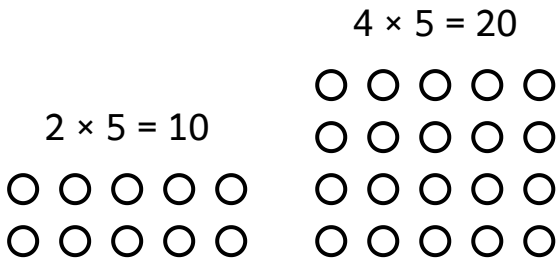
You can count in 3s and in 4s. Do it as you did in 5s.

The 3 times table counts 3, 6, 9, 12 and on. The 4 times table counts 4, 8, 12, 16 and on.



Six hops of 3 land on 18. So 6 × 3 = 18.

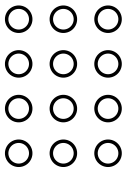
The 4 times table is the 2 times table doubled. To **double** is to make twice as many.
The 8 times table is the 4 times table doubled.



Twice as many rows gives twice as many dots. 10 doubled is 20.

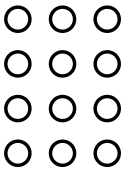
DRAW IT FIRST

Double 4 × 3 to get 8 × 3

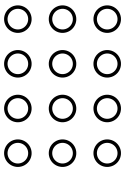


4 × 3 = 12

1 Draw 4 rows of 3 dots. That is 4 × 3 = 12.

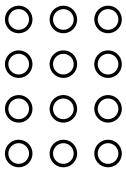


4 × 3 = 12

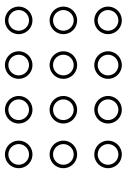


12 again

2 Draw 4 more rows of 3 dots below. That is 12 again.



12 + 12 = 24



8 × 3 = 24

3 Now there are 8 rows of 3. Add: 12 + 12 = 24.

8 rows is double 4 rows. So 8 × 3 is double 4 × 3. The 8 times table is the 4 times table doubled.

4s	4 8 12 16 20 24 28 32 36 40
8s	8 16 24 32 40 48 56 64 72 80

Each answer in the 8s is double the answer above it.

WORKED EXAMPLE

Find 8 × 7. Use the 4 times table.

1. Find 4 × 7 first. Count in 4s seven times to get 28.
2. 8 is double 4, so double the answer.
3. Double 28 is 28 + 28, which is 56.

Answer: 8 × 7 = 56

Now look at the last digits of the 3s, 4s and 8s. They make patterns.

3s	3	6	9	2	5	8	1	4	7	0
4s	4	8	2	6	0	4	8	2	6	0
8s	8	6	4	2	0	8	6	4	2	0

The 3s use every digit. The 4s and 8s use only even digits.

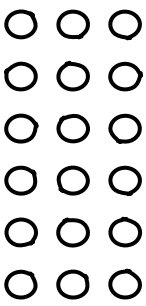
The 4s go 4, 8, 2, 6, 0. The 8s go down in twos: 8, 6, 4, 2, 0. Both repeat.

SEE IT THREE WAYS

With things

Put 18 stones in 6 rows.
Put 3 stones in each row.
Count in 3s.

As a picture



6 rows of 3

In symbols

6 × 3 = 18. Count: 3, 6, 9, 12, 15, 18.

TRY IT

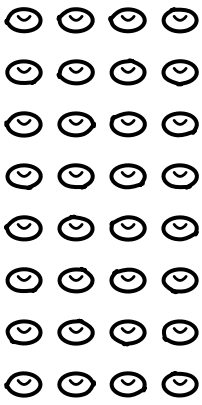
Double an array of beans

You need: 32 beans, or 32 small stones, a flat table.

1. Make an array of 4 rows with 4 beans in each row.
2. Count the beans. That is 4 × 4.
3. Make a second array exactly the same, under the first.
4. Count all the beans. Is it double?

What you will see: The first array has 16 beans. Both arrays make 8 rows of 4, which is 32. So 8 × 4 = 32.

If you cannot try it, this is what happens.



8 rows of 4

A WRONG IDEA MANY PEOPLE HAVE

~~8 × 7 is 54.~~

Why it feels right: 54 sounds right. It is a real answer in the tables, because 6 × 9 = 54.

The test that breaks it: Double the 4 times table. 4 × 7 is 28. Now double 28.

What is true: 28 + 28 = 56. So 8 × 7 = 56. The number 54 belongs to 6 × 9.

KEY WORDS

double
to make twice as many. Double 4 is 8.

BACK TO YOUR GUESS

The answer is B: Double each answer.

8 is double 4. So 8 groups are double 4 groups. 4 × 6 = 24, so 8 × 6 = 24 + 24 = 48.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. 4 × 6 = 24. Use it to find 8 × 6.

   A 48

   B 28

   C 12

   Answer at the back of the book.

2. Count in 3s to find 3 × 9.

   Answer at the back of the book.

3. Write the 4 times table, from 1 × 4 to 10 × 4.

   Answer at the back of the book.

4. **From an earlier chapter**

   Amina shares 24 stones between 8 friends. How many stones does each friend get?

   A 3 stones

   B 16 stones

   C 8 stones

   Answer at the back of the book.

5. What is 8 × 7?

   A 54

   B 56

   C 64

   Answer at the back of the book.

6. Ravi counts in 3s: 3, 6, 9, 12. Which number comes next?

   A 13

   B 16

   C 15

   Answer at the back of the book.

7. Kofi has 6 stools. Each stool has 4 legs. How many legs are there?

   A 24

   B 10

   C 20

   Answer at the back of the book.

8. Think of 8, 16, 24, 32 and 40. Which list shows the last digit of each?

   A 8, 1, 2, 3, 4

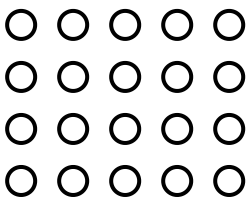
   B 8, 6, 4, 2, 0

   C 8, 8, 8, 8, 8

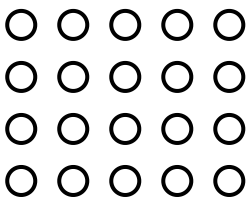
   Answer at the back of the book.

9. Look at the two arrays. Together they show 8 × 5. What is 8 × 5?

first array



second array



A 20

B 13

C 40

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Count in 3s and 4s. The 4 times table is double the 2 times table. The 8 times table is double the 4 times table. 8 × 7 = 28 + 28 = 56.

Draw: Draw 4 rows of 3 dots, then 4 more rows below. Write 4 × 3 = 12 and 8 × 3 = 24.

M2.3.5 CHAPTER 5

The 6, 7 and 9 times tables

I can never remember 6 × 7 or 9 × 8. Is there a trick?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** No. I must learn every fact by heart.
- ☐ **B** Yes. Each hard fact is built from a fact I know.
- ☐ **C** Yes. The answer is always 10 more than the biggest number.

BY THE END YOU CAN

- Say the 6, 7 and 9 times tables
- Work out 9 × 7 as 10 × 7 − 7

A **times table** lists the answers for one number. You know the 2, 3, 4, 5 and 10 tables. Now we build the last three from them.

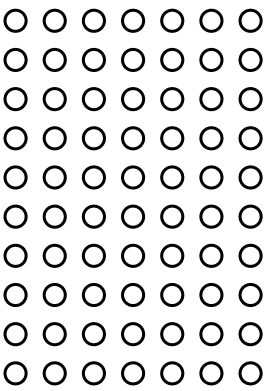
Start with the sixes. A six is two threes. So 6 × 4 is **double** 3 × 4. To double is to make twice as much.

3 × 4 = 12. Double 12 is 24. So 6 × 4 = 24.

Now the nines. Nine is one less than ten. So 9 × 7 is 10 rows of 7, less one row.

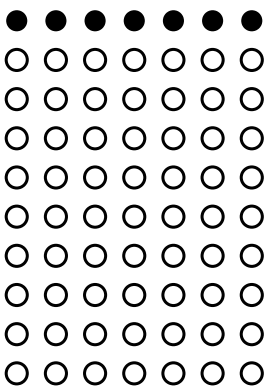
DRAW IT FIRST

Find 9 × 7 from 10 × 7



10 × 7 = 70

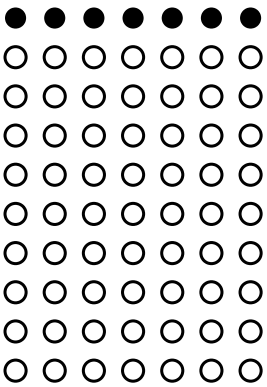
1 Draw 10 rows of 7 dots. That is 10 × 7 = 70.



10 × 7 = 70

take away 7

2 Fill in one whole row. This is the row to take away. It has 7 dots.



10 × 7 = 70

take away 7

70 − 7 = 63

9 × 7 = 63

3 Count the empty rows. There are 9. So 9 × 7 = 70 − 7 = 63.

The rule for nines: work out 10 × the number. Then take away the number.

WORKED EXAMPLE

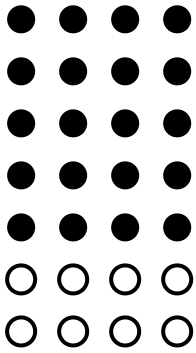
Work out 9 × 6.

1. 10 × 6 = 60.
2. Take away one 6. 60 − 6 = 54.

Answer: 9 × 6 = 54

The sevens are a five and a two. For 7 × 8, do 5 × 8 and 2 × 8. Then add.

See it first with 7 rows of 4 dots. Fill in 5 rows. The other 2 rows are empty.



5 × 4 = 20

2 × 4 = 8

A seven is a five and a two. 7 × 4 = 20 + 8 = 28.

WORKED EXAMPLE

Work out 7 × 8.

1. 5 × 8 = 40.
2. 2 × 8 = 16.
3. 40 + 16 = 56.

Answer: 7 × 8 = 56

6s	6 12 18 24 30 36 42 48 54 60
7s	7 14 21 28 35 42 49 56 63 70
9s	9 18 27 36 45 54 63 72 81 90

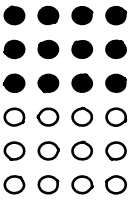
The three tables. Say each row out loud.

SEE IT THREE WAYS

With things

Put 4 stones in each of 6 rows. Cover 3 rows with your hand. Count 12. Double it.

As a picture



3 × 4 = 12

3 × 4 = 12

In symbols

6 × 4 = 3 × 4 + 3 × 4 = 12 + 12 = 24.

TRY IT

Look for a pattern in the nines

You need: a pencil, a sheet of paper, or an old page.

1. Write 9 × 2 = 18 and 9 × 3 = 27. Then 9 × 4 = 36 and 9 × 5 = 45.
2. Beside each answer, add its two digits.
3. Carry on to 9 × 10 = 90.

What you will see: The digits of every answer add to 9. The tens digit goes up by 1. The ones digit goes down by 1. You can use this to check a nine.

If you cannot try it, this is what happens.

9 × 2 = 18	**1 + 8 = 9**
9 × 3 = 27	**2 + 7 = 9**
9 × 4 = 36	**3 + 6 = 9**
9 × 5 = 45	**4 + 5 = 9**

A WRONG IDEA MANY PEOPLE HAVE

~~9 × 7 is 10 × 7 take away 9. So it is 61.~~

Why it feels right: The nine is right there in 9 × 7. It seems the number to take away.

The test that breaks it: Make 10 rows of 7 dots. Take away one row. Count what is left. You get 63, not 61. One row is 7 dots, not 9.

What is true: Take away one row. One row is the other number. 9 × 7 = 70 − 7 = 63.

KEY WORDS

double
to make twice as much.

times table
the answers when you count in equal groups of one number.

BACK TO YOUR GUESS

The answer is B: Yes. Each hard fact is built from a fact I know.

Sixes are double the threes. Nines are tens with one group taken away. Sevens are fives plus twos. You already know those tables.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. What is 6 × 8? Double 3 × 8 to find out.

   A 48

   B 42

   C 14

Answer at the back of the book.

2. Use 10 × 6 to work out 9 × 6.

   Answer at the back of the book.

3. Mei puts 8 stones in each of 7 bags. How many stones is that?

   Answer at the back of the book.

4. Kofi says 9 × 4 = 32. Is he right?

   A Yes, because 8 × 4 = 32.

   B No. 9 × 4 = 36.

   C No. 9 × 4 = 31.

   Answer at the back of the book.

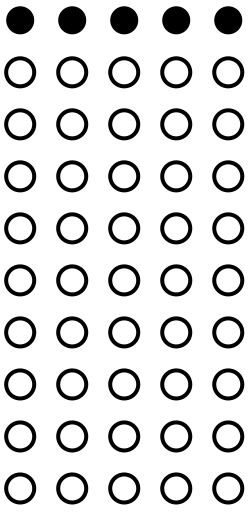
5. **From an earlier chapter**

   Use 4 × 6 = 24 to find 8 × 6.

   Answer at the back of the book.

6. Look at the dots. Take away the shaded row. How many dots are left?

10 rows of 5



   A 41

   B 49

   C 45

   Answer at the back of the book.

7. What is 7 × 6? Use 5 × 6 and 2 × 6.

   A 13

   B 42

   C 30

   Answer at the back of the book.

8. Hana knows 3 × 9 = 27. Which sum gives 6 × 9?

   A 27 + 6 = 33

   B 27 + 9 = 36

   C 27 + 27 = 54

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Sixes are double threes: 6 × 4 = 12 + 12. Nines are tens less one group: 9 × 7 = 70 − 7. Sevens are fives plus twos: 7 × 8 = 40 + 16.

Draw: Ten rows of 7 dots. Fill in one row. Write 70 − 7 = 63.

M2.3.6 CHAPTER 6

Times and divide facts together

I know 3 × 7 = 21. Does that help me with 21 ÷ 3?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** No. Times and divide have nothing to do with each other.
- ☐ **B** Yes. 21 ÷ 3 asks: 3 times what makes 21?
- ☐ **C** Yes. 21 ÷ 3 is the same as 21 − 3.

BY THE END YOU CAN

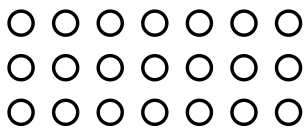
- Write the four facts that link 3, 7 and 21
- Use a times fact to answer a divide question
- Show that 6 × 4 and 4 × 6 give the same answer

Look at 3 rows of 7 dots. There are 21 dots in all.

This one picture tells you four things. Watch.

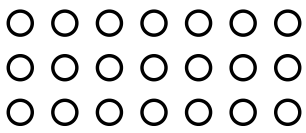
DRAW IT FIRST

Four facts from one array



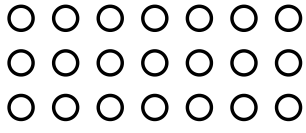
3 × 7 = 21

1 Count 3 rows of 7. That is 3 × 7 = 21.



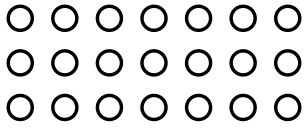
3 × 7 = 21
7 × 3 = 21

2 Turn the array on its side. You see 7 rows of 3. That is 7 × 3 = 21.



3 × 7 = 21
7 × 3 = 21
21 ÷ 3 = 7

3 Share the 21 dots into 3 rows. Each row has 7. So 21 ÷ 3 = 7.



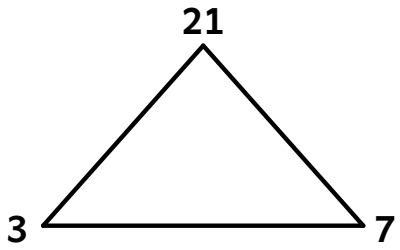
3 × 7 = 21
7 × 3 = 21
21 ÷ 3 = 7
21 ÷ 7 = 3

4 Share them into 7 columns. Each column has 3. So 21 ÷ 7 = 3.

These four facts are a **fact family**. They all use the same three numbers.

The biggest number in the 3, 7 and 21 family is 21. It is the answer to the times facts. It comes first in the divide facts.

You can draw a family as a triangle. The biggest number goes at the top.



Times uses the bottom two numbers to make the top. Divide starts at the top.

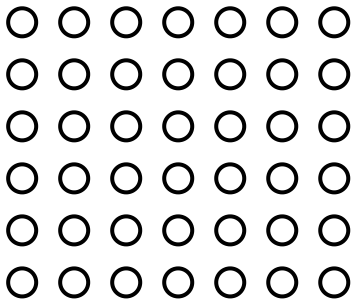
WORKED EXAMPLE

Write the four facts for 4, 6 and 24.

1. The biggest number is 24. It is the answer to the times facts.
2. 4 × 6 = 24 and 6 × 4 = 24.
3. Now divide 24. 24 ÷ 4 = 6 and 24 ÷ 6 = 4.

Answer: 4 × 6 = 24, 6 × 4 = 24, 24 ÷ 4 = 6, 24 ÷ 6 = 4

A times fact answers a divide question. For 42 ÷ 6, ask: 6 times what makes 42?



6 × 7 = 42

42 ÷ 6 = 7

6 rows of 7 make 42. Share the 42 into 6 rows and each row has 7.

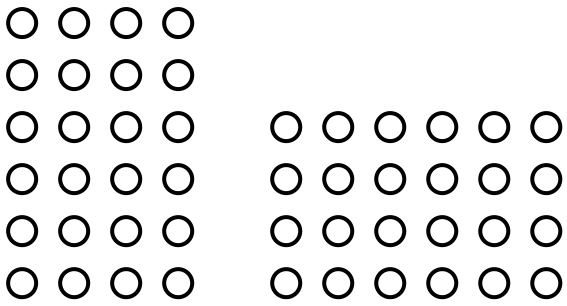
WORKED EXAMPLE

Work out 42 ÷ 6.

1. Ask: 6 times what makes 42?
2. You know 6 × 7 = 42.
3. So 42 ÷ 6 = 7.

Answer: 7

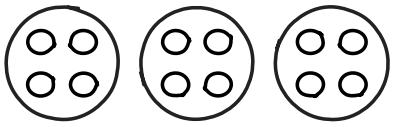
Times can swap places. Look at 6 × 4 and 4 × 6.



6 × 4 = 24 4 × 6 = 24

Turn the left array on its side. It becomes the right array. The number of dots does not change.

SEE IT THREE WAYS

With things	As a picture	In symbols
Put 12 stones in 3 groups of 4. Share them out again into 4 groups of 3.		**3 × 4 = 12 and 4 × 3 = 12. 12 ÷ 3 = 4 and 12 ÷ 4 = 3.**

TRY IT

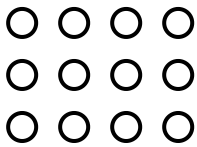
Make a fact family with stones

You need: 12 stones, beans or sticks, a pencil and paper.

1. Make 3 rows of 4 stones. Write 3 × 4 = 12.
2. Look at the stones from the side. You see 4 rows of 3. Write 4 × 3 = 12.
3. Share the stones into 3 equal groups. Write 12 ÷ 3 = 4.
4. Share them into 4 equal groups. Write 12 ÷ 4 = 3.

What you will see: Four facts come from three numbers: 3, 4 and 12. They make one fact family.

If you cannot try it, this is what happens.



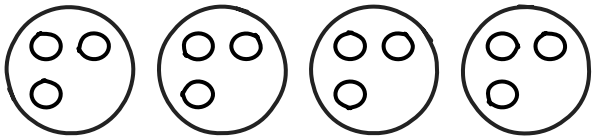
3 × 4 = 12

4 × 3 = 12

12 ÷ 3 = 4

12 ÷ 4 = 3

12 ÷ 4 = 3



4 stones for 12 friends



12 stones between 4 friends: 3 each. 4 stones between 12 friends: not a whole one each.

A WRONG IDEA MANY PEOPLE HAVE

~~Divide can swap places too. 12 ÷ 4 is the same as 4 ÷ 12.~~

Why it feels right: Times swaps places, so it seems that divide will too.

The test that breaks it: Share 12 stones between 4 friends. Each gets 3. Now share 4 stones between 12 friends. Nobody gets a whole stone.

What is true: Times can swap places. Divide cannot. 12 ÷ 4 = 3. The biggest number comes first.

KEY WORDS

fact family
times and divide facts that use the same three numbers.

BACK TO YOUR GUESS

The answer is B: Yes. 21 ÷ 3 asks: 3 times what makes 21?

Times and divide are partners. 3 × 7 = 21, so 21 ÷ 3 = 7. One picture gives you four facts.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Which fact is in the same family as 4 × 5 = 20?

   A 20 ÷ 5 = 4

   B 20 ÷ 2 = 10

   C 5 + 4 = 9

   Answer at the back of the book.

2. Use 7 × 6 = 42 to answer 42 ÷ 6.

   Answer at the back of the book.

3. Write the four facts for 5, 8 and 40.

   Answer at the back of the book.

4. Ravi says 6 × 4 is more than 4 × 6. Is he right?

   A Yes, because 6 is bigger than 4.

   B No. They are both 10.

   C No. They are both 24.

   Answer at the back of the book.

5. **From an earlier chapter**

   Work out 9 × 8. Use 10 × 8.

   Answer at the back of the book.

6. Which list has all four facts for 2, 9 and 18?

   A 2 × 9 = 18, 9 × 2 = 18, 18 ÷ 2 = 9, 18 ÷ 9 = 2

   B 2 × 9 = 18, 9 × 2 = 18, 2 ÷ 18 = 9, 9 ÷ 18 = 2

   C 2 + 9 = 11, 9 + 2 = 11, 11 − 2 = 9, 11 − 9 = 2

   Answer at the back of the book.

7. 6 × 8 = 48. What is 48 ÷ 6?

   A 42

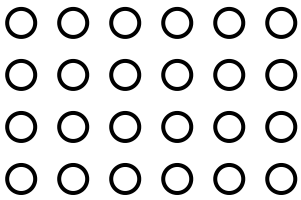
   B 8

   C 6

   Answer at the back of the book.

8. Share the dots between 3 friends. Which fact says how many each friend gets?

dots to share



A 3 ÷ 24 = 8

B 24 − 3 = 21

C 24 ÷ 3 = 8

Answer at the back of the book.

9. Is 20 ÷ 5 the same as 5 ÷ 20?

A Yes. Divide can swap places like times.

B No. Times cannot swap places either.

C No. Times can swap places but divide cannot.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Three numbers make four facts. 3 × 7 = 21, 7 × 3 = 21, 21 ÷ 3 = 7, 21 ÷ 7 = 3. Times can swap. Divide cannot.

Draw: An array of 3 rows of 7 dots. Write the four facts beside it.

M2.3.7 CHAPTER 7

Remainders

> **I have 17 stones. I make groups of 5. What about the extra stones?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** There are no extra stones. 17 cannot be shared by 5.
- ☐ **B** There are 3 groups of 5, and 2 stones left over.
- ☐ **C** There are 4 groups, because 17 is close to 20.

BY THE END YOU CAN

- Share 17 into groups of 5 and say what is left over
- Decide whether to round up or down in a story

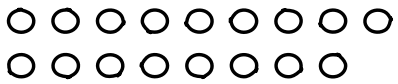
Some numbers do not share out evenly. A few things are left over.

Take 17 stones. Make groups of 5. You can make 3 full groups. That uses 15 stones.

The 2 stones left over are the **remainder**. We write 17 ÷ 5 = 3, remainder 2.

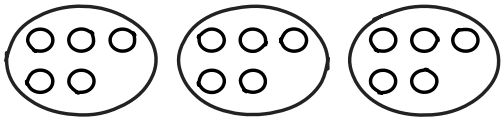
DRAW IT FIRST

Share 17 stones into groups of 5



17 stones

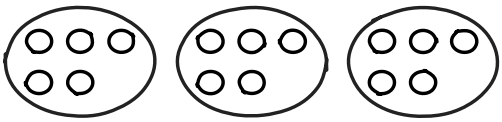
1 Put out 17 stones.



3 groups of 5



2 Make groups of 5. You can make 3 full groups. Two stones are in no group.



3 groups of 5



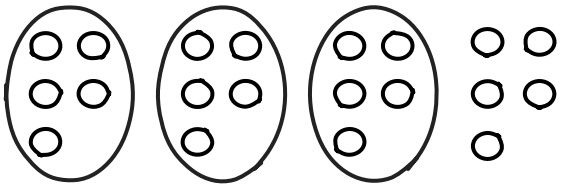
remainder 2

3 The 2 stones left over are the remainder.

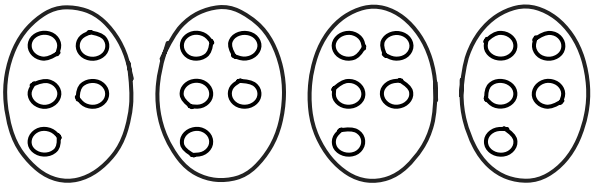
You can always check. Groups times size, plus the remainder, gives the start. 3 × 5 + 2 = 17.

The remainder is always smaller than the group size. Here 2 is smaller than 5. If it were 5, you could make one more group.

3 groups of 5, 5 left over



5 left over makes a 4th group



A remainder of 5 is not a remainder. Those 5 stones make one more group.

WORKED EXAMPLE

Work out 23 ÷ 4.

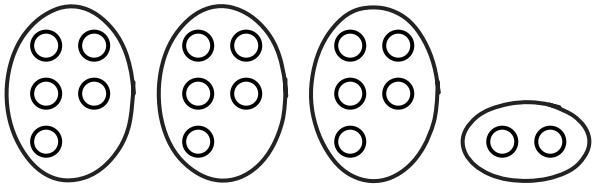
1. Count in 4s: 4, 8, 12, 16, 20. The next one, 24, is too big.
2. So 5 groups of 4 fit. 5 × 4 = 20.
3. What is left? 23 − 20 = 3.

Answer: 5 groups, remainder 3

In a story, you must decide what to do with the remainder. Look at two stories.

Story one. 17 children must ride in cars. A car holds 5. How many cars?

17 ÷ 5 = 3, remainder 2. Two children still need a seat. They need another car. So 4 cars. This is to **round up**. You go up to the next whole number.

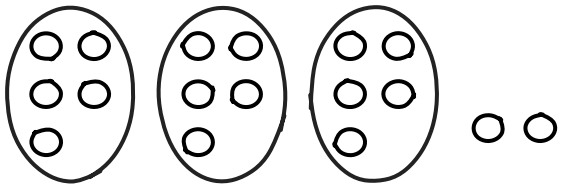


3 full cars car 4

The 2 children left over need a car. Round up to 4 cars.

Story two. 17 eggs go in boxes. A box holds 5. How many full boxes?

Again 17 ÷ 5 = 3, remainder 2. Two eggs do not fill *a* box. So 3 full boxes. This is to **round down**. You drop the remainder.



3 full boxes left over

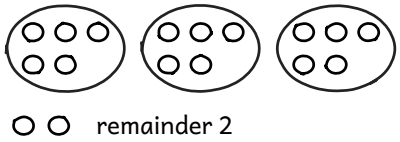
The 2 eggs left over do not fill *a* box. Round down to 3 boxes.

SEE IT THREE WAYS

With things

Put out 17 stones. Take away groups of 5 until you cannot take another.

As *a* picture



In symbols

17 ÷ 5 = 3, remainder 2. Check: 3 × 5 + 2 = 17.

TRY IT

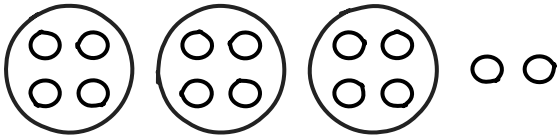
Share 14 stones two ways

You need: 14 stones, beans or sticks.

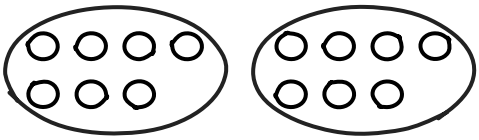
1. Put out 14 stones.
2. Make groups of 4. Count the full groups. Count the stones left over.
3. Put them all back. Now make groups of 7.
4. Count the full groups. Count the stones left over.

What you will see: Groups of 4 leave 2 stones. Groups of 7 leave none. The remainder is 0 when a number shares out exactly.

If you cannot try it, this is what happens.



3 groups of 4, remainder 2



2 groups of 7, remainder 0

A WRONG IDEA MANY PEOPLE HAVE

~~The remainder is always dropped. 17 children in cars of 5 need 3 cars.~~

Why it feels right: The sum 17 ÷ 5 gives 3. So 3 looks like the answer.

The test that breaks it: Put 17 stones in 3 groups of 5. Two stones are in no group. In the story, two children would have no seat.

What is true: Read what the story asks. If the rest still need a place, round up. If only full groups count, round down.

KEY WORDS

remainder
what is left over when things do not share out evenly.

round up
to go up to the next whole number.

round down
to drop the remainder and keep the whole number.

BACK TO YOUR GUESS

The answer is B: There are 3 groups of 5, and 2 stones left over.

Three groups of 5 use 15 stones. Two are left over. That is the remainder. A story then tells you what to do with it.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Put 20 stones in groups of 6. How many stones are left over?

   A 2

   B 3

   C 14

   Answer at the back of the book.

2. Work out 29 ÷ 5. Say the groups and the remainder.

   Answer at the back of the book.

3. Lucía takes 23 children across a river. A boat holds 6. How many boats?

   A 4 boats

   B 3 boats

   C 5 boats

   Answer at the back of the book.

4. Joseph has 23 sticks. A bundle needs 6 sticks. How many full bundles can he make?

   Answer at the back of the book.

5. **From an earlier chapter**

   Share 24 beans fairly between 4 friends. How many beans does each friend get?

   Answer at the back of the book.

6. Stones go in groups of 5. Which number can be a remainder?

   A 5

   B 3

   C 7

   Answer at the back of the book.

7. Sipho has 31 beans. A pot needs 7 beans. How many full pots can he fill?

   A 5 pots

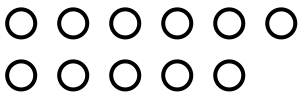
   B 3 pots

   C 4 pots

   Answer at the back of the book.

8. A boat holds 4 people. How many boats do these people need?

   people waiting

   A 2 boats

   B 4 boats

   C 3 boats

   Answer at the back of the book.

9. Which number makes groups of 4 with nothing left over?

A 14

B 34

C 20

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

The remainder is what is left over. Groups times size, plus remainder, gives the start. 17 ÷ 5 = 3, remainder 2. In a story, round up if the rest need a place.

Draw: 17 stones. Ring 3 groups of 5. Show the 2 left over. Write 3, remainder 2.

M2.3.8 CHAPTER 8

Times and divide with bigger numbers

What happens to 35 when I times it by 10?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** It becomes 45. Times 10 adds 10.
- ☐ **B** Each digit moves one place left. It becomes 350.
- ☐ **C** It becomes 3510. I write 10 after it.

IF THIS FEELS HARD, READ THIS FIRST

- Level 2, Big numbers and place value, M2.1.1. Know what each digit is worth before you move the digits.

BY THE END YOU CAN

- Multiply by 10 and 100 and see how the digits move
- Multiply numbers like 23 × 4 on paper
- Divide numbers like 84 ÷ 4 on paper

Big numbers use the same ideas as small ones. First, times 10.

The **place value** of a digit is what it is worth. It depends on where the digit stands.

35 is 3 tens and 5 ones. Ten times as much is 3 hundreds and 5 tens.

DRAW IT FIRST

Times 10 moves the digits left

hundreds	tens	ones
	3	5

1 Write 35 on a chart. The 3 is in tens. The 5 is in ones.

hundreds	tens	ones
	3	5

× 10

hundreds	tens	ones
3	5	0

2 Times 10. Each digit moves one place left. The 3 is in hundreds. The 5 is in tens.

hundreds	tens	ones
	3	5

× 10

hundreds	tens	ones
3	5	0

35 × 10 = 350

3 The ones place is empty, so it holds a 0. 35 × 10 = 350.

Times 100 moves every digit two places left. 35 × 100 = 3500.

thousands	hundreds	tens	ones
		3	5

× 100

thousands	hundreds	tens	ones
3	5	0	0

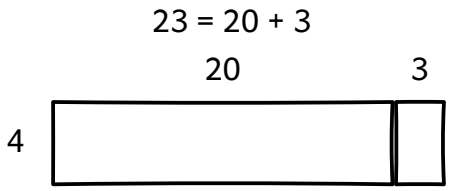
Times 100 moves each digit two places left. The two empty places hold 0.

Now a number such as 23 × 4. Split 23 into 20 and 3. To split a number into parts like this is to **partition** it.

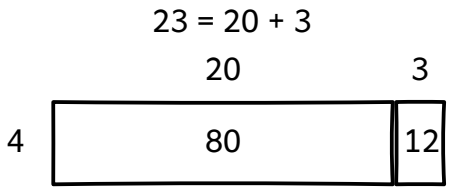
Times each part by 4. Then add. We draw a box for each part.

DRAW IT FIRST

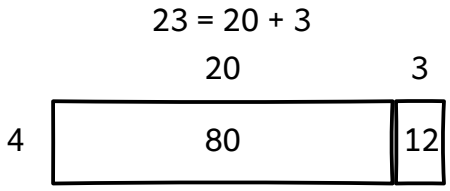
Work out 23 × 4 in boxes



1 Split 23 into 20 and 3. Draw a box for each. Write 4 beside them.



2 Times each part by 4. 20 × 4 = 80 and 3 × 4 = 12.



80 + 12 = 92

23 × 4 = 92

3 Add the two boxes. 80 + 12 = 92. So 23 × 4 = 92.

WORKED EXAMPLE

Work out 36 × 5.

1. Split 36 into 30 and 6.
2. 30 × 5 = 150.
3. 6 × 5 = 30.
4. Add. 150 + 30 = 180.

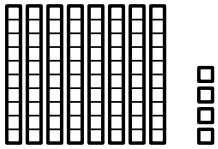
Answer: 36 × 5 = 180

Dividing works the same way. Split the big number into parts that share out well.

Take 84 ÷ 4. Split 84 into 80 and 4. Both parts divide by 4.

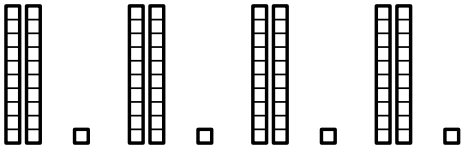
DRAW IT FIRST

Work out 84 ÷ 4 with blocks



84

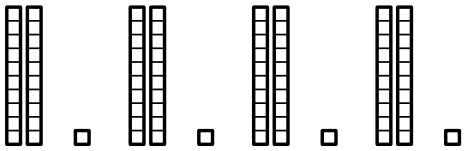
1 Show 84 as 8 tens and 4 ones.



21 21 21 21

4 equal groups

2 Share them into 4 equal groups. Each group gets 2 tens and 1 one.



21 21 21 21

4 equal groups

80 ÷ 4 = 20 4 ÷ 4 = 1

84 ÷ 4 = 20 + 1 = 21

3 Each group is 21. 80 ÷ 4 = 20 and 4 ÷ 4 = 1. So 84 ÷ 4 = 21.

WORKED EXAMPLE

Work out 78 ÷ 3.

1. Split 78 into 60 and 18. Both divide by 3.
2. 60 ÷ 3 = 20.
3. 18 ÷ 3 = 6.
4. Add. 20 + 6 = 26.

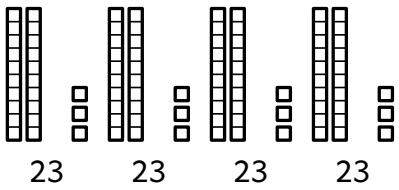
Answer: 78 ÷ 3 = 26

SEE IT THREE WAYS

With things

Make 4 piles. Each pile has 2 bundles of ten sticks and 3 single sticks. Count the tens, then the ones.

As a picture



In symbols

23 × 4 = 20 × 4 + 3 × 4. 20 × 4 = 80 and 3 × 4 = 12. 80 + 12 = 92.

TRY IT

Times 10 on a paper chart

You need: a pencil, a sheet of paper, or an old page.

1. Draw three columns. Write hundreds, tens and ones over them.
2. Write 27 in the chart. The 2 is in tens. The 7 is in ones.
3. Now times 10. Move each digit one column to the left.
4. Write 0 in the empty ones column. Read the number.

What you will see: You read 270. Check it. Add 27 ten times. You also get 270.

If you cannot try it, this is what happens.

hundreds	tens	ones
	2	7

× 10

hundreds	tens	ones
2	7	0

A WRONG IDEA MANY PEOPLE HAVE

~~23 × 4 = 812, because 2 × 4 = 8 and 3 × 4 = 12.~~

Why it feels right: You times each digit by 4. It seems fair to write the answers side by side.

The test that breaks it: Add 23 four times. 23 + 23 = 46. 46 + 46 = 92. The answer is 92. It is far less than 812.

What is true: The 2 is 2 tens, not 2 ones. 2 tens × 4 = 80. Then add 3 × 4 = 12. 80 + 12 = 92.

KEY WORDS

place value
what a digit is worth, because of the place it stands in.

partition
to split a number into parts, such as 20 and 3. The parts use tables you know.

BACK TO YOUR GUESS

The answer is B: Each digit moves one place left. It becomes 350.

Times 10 moves every digit one place to the left. The empty ones place holds a 0. So 35 × 10 = 350.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. What is 46 × 10?

   A 460

   B 56

   C 4610

   Answer at the back of the book.

2. Mei has 6 bags. Each bag holds 100 beans. How many beans is that?

   Answer at the back of the book.

3. Work out 32 × 3. Split 32 into 30 and 2.

   Answer at the back of the book.

4. Work out 68 ÷ 4. Split 68 into 40 and 28.

   Answer at the back of the book.

5. **From an earlier chapter**

   Use 8 × 7 = 56 to answer 56 ÷ 7.

   Answer at the back of the book.

6. The chart shows 4. What is 4 × 100?

hundreds	tens	ones
		4

   A 40

   B 4 100

   C 400

   Answer at the back of the book.

7. Tariq works out 34 × 3. Which answer is right?

   A 912

   B 21

   C 102

   Answer at the back of the book.

8. Work out 96 ÷ 3. Split 96 into 90 and 6. What is the answer?

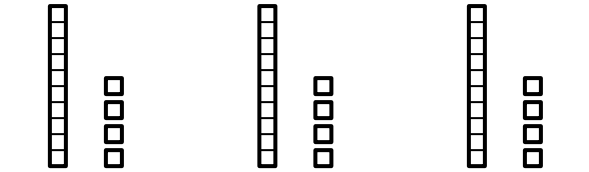
   A 302

   B 32

   C 30

   Answer at the back of the book.

9. The groups of blocks are all the same. How many are there in all?



one group one group one group

A 312

B 42

C 17

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Times 10 moves each digit one place left. Split to multiply: 23 × 4 = 80 + 12 = 92. Split to divide: 84 ÷ 4 = 20 + 1 = 21.

Draw: A box grid. Write 20 and 3 across the top and 4 at the side. Write 80 and 12 inside.

Key words, A to Z

Every key word in this book, what it means, and the chapter that teaches it.

array
things set out in equal rows. M2.3.1

digit
one of the figures 0 to 9. In 35, the last digit is 5. M2.3.2

divide
to split into equal groups. The sign is ÷. M2.3.3

double
to make twice as many. Double 4 is 8. M2.3.4, M2.3.5

equal groups
groups that all have the same number of things. M2.3.1

even
a number that shares into 2 equal groups with none left. M2.3.2

fact family
times and divide facts that use the same three numbers. M2.3.6

grouping
finding how many groups of one size you can make. M2.3.3

partition
to split a number into parts, such as 20 and 3. The parts use tables you know. M2.3.8

place value
what a digit is worth, because of the place it stands in. M2.3.8

remainder
what is left over when things do not share out evenly. M2.3.7

round down
to drop the remainder and keep the whole number. M2.3.7

round up
to go up to the next whole number. M2.3.7

row
a line of things going across. M2.3.1

sharing

dealing things out equally, one at a time. M2.3.3

times
groups of. 4 × 3 is read "4 times 3". M2.3.1

times table
a list of answers for more and more equal groups. M2.3.2, M2.3.5

Answers

M2.3.1. Equal groups

1. **3 × 4 = 12**

   There are 3 groups with 4 beans in each. 4 + 4 + 4 = 12.

   - **If you chose B:** That adds the 3 groups to the 4 beans. A times sum means 3 groups of 4.
   - **If you chose C:** Each group has 4 beans, not 3. Count the beans in one group.

2. **15 stones**

   5 bowls of 3 is 5 × 3. Add: 3 + 3 + 3 + 3 + 3 = 15.

   - **If you chose A:** That is 5 + 3. A times sum means 3 stones, five times.
   - **If you chose B:** That is the stones in one bowl. There are 5 bowls, so count 3 five times.

3. **They have the same number.**

   2 × 6 = 12 and 6 × 2 = 12. Turn one array on its side and you get the other.

   - **If you chose A:** Her rows are longer, but she has fewer of them. Count all the dots.
   - **If you chose B:** He has more rows, but his rows are shorter. Count all the dots.

4. **3 × 5 = 15. You can also write 5 × 3 = 15.**

   There are 3 rows with 5 dots in each row. 5 + 5 + 5 = 15. Turned on its side it is 5 rows of 3.

5. **5 × 2 = 10. There are 10 dots.**

   2 + 2 + 2 + 2 + 2 = 10. That is 5 groups of 2.

6. **6 columns**

   There are 2 rows and 6 seeds in each row. A column goes down. Each row has 6 seeds, so there are 6 columns.

   - **If you chose A:** That is the number of rows. A row goes across. A column goes down.
   - **If you chose C:** That is the number of seeds. A column is a line of seeds going down.

7. **2 × 5 = 10**

   5 × 2 = 10. Turn the array on its side. It is 2 rows of 5. 2 × 5 = 10 too.

   - **If you chose B:** You added. 5 × 2 means 5 groups of 2. Add 2 five times.
   - **If you chose C:** You used 5 twice. In 5 × 2 each group has 2, not 5. 2 + 2 + 2 + 2 + 2 = 10.

M2.3.2. The 2, 5 and 10 times tables

1. **52**

   Answers in the 5 times table end in 5 or 0. 52 ends in 2.

   - **If you chose A:** Count 7 fives and you reach 35.
   - **If you chose B:** 40 ends in 0, as many 5 table answers do. Count 8 fives and you reach 40.

2. **12, 30 and 60**

   6 × 2 is the double of 6, which is 12. Six fives are 30. Six tens are 60.

3. **4 × 5 = 20**

   4 groups of 5 is 4 × 5. Count in 5s: 5, 10, 15, 20.

   - **If you chose A:** That puts 4 and 5 together. Times means 4 groups of 5. Go to M2.3.1.

4. **No. Those answers end in 0, 2, 4, 6 or 8.**

   45 ends in 5, so it is not even. It is in the 5 times table instead: 9 × 5 = 45.

   - **If you chose A:** Count in 2s: 44, 46. You jump over 45. Every answer in the 2 times table is even.
   - **If you chose B:** Even depends on the last digit only. 45 ends in 5, so it is odd.

5. **18 sandals**

   A pair is 2. 9 pairs is 9 × 2, which is 9 + 9 = 18.

6. **35**

   Count 7 fives: 5, 10, 15, 20, 25, 30, 35. 7 × 5 = 35.

   - **If you chose A:** You added 7 + 5. Times means 7 groups of 5. Go to M2.3.1.
   - **If you chose B:** That is 6 fives. Count one more 5 to reach 7 fives.

7. **60**

   6 rods of 10 is 6 × 10. Count in 10s: 10, 20, 30, 40, 50, 60.

   - **If you chose B:** You added 6 and 10. Each rod is worth 10, so count in 10s. Go to M2.3.1.
   - **If you chose C:** That is how many rods there are. Each rod is worth 10, so 6 rods are 6 tens.

8. **5, 0, 5, 0**

   The last digit of 5 is 5. Of 10 it is 0. Of 15 it is 5. Of 20 it is 0.

   - **If you chose A:** That is the wrong idea that every answer ends in 5. 2 × 5 = 10 ends in 0.
   - **If you chose C:** Those are the first digits. The last digit is on the right: 15 ends in 5.

9. **It is always even.**

   Each answer is a double. A double shares into 2 equal groups with none left. That is what even means.

   - **If you chose A:** 5 × 2 = 10 ends in 0. The last digits go 2, 4, 6, 8, 0 and repeat.
   - **If you chose B:** That is the 5 times table. The 2 times table ends in 2, 4, 6, 8 or 0.

M2.3.3. Sharing and grouping

1. **5 stones**

   15 ÷ 3 = 5. Check: 5 × 3 = 15.

   - **If you chose A:** You took 3 away. Sharing means each friend gets the same. Deal them out to see.
   - **If you chose B:** The 3 is the number of friends. It is not the number each one gets.

2. **7 groups**

   Count in 4s: 4, 8, 12, 16, 20, 24, 28. That is 7 numbers. Check: 7 × 4 = 28.

3. **4 beans**

   Use the 10 times table. 4 × 10 = 40, so 40 ÷ 10 = 4.

4. **Yes. Both give 4.**

   20 ÷ 5 = 4. Each friend gets 4 beans, and there are 4 groups of 5.

   - **If you chose B:** Count in 5s up to 20: 5, 10, 15, 20. That is 4 groups, not 5.
   - **If you chose C:** Deal 20 beans to 5 friends. Each gets 4, not 5. Count the groups of 5 as well: 4.

5. **18 ÷ 3 = 6**

   Each friend gets 6 stones. Check: 6 × 3 = 18.

6. **4 groups**

   Count in 6s: 6, 12, 18, 24. That is 4 numbers. Check: 4 × 6 = 24.

   - **If you chose A:** The 6 is the size of each group. You are asked how many groups there are.
   - **If you chose B:** You took 6 away. Grouping counts how many 6s fit in 24.

7. **18 ÷ 3 = 6**

   Deal 18 stones to 3 friends. Each friend gets 6. Check: 6 × 3 = 18.

   - **If you chose A:** You took 3 away. Sharing deals the pile out equally, so you divide.
   - **If you chose C:** That is true, but it is a times sum. Sharing is written with ÷.

8. **Each friend gets 4 beans.**

   12 beans dealt out to 3 friends gives 4 each. 4 + 4 + 4 = 12.

   - **If you chose B:** The friends are 3. The 4 is the number of beans each friend gets.
   - **If you chose C:** All 12 beans are dealt out, so none are left over. 4 + 4 + 4 = 12.

9. **6 × 4 = 24**

   Division and times go together. 6 × 4 = 24, so 24 ÷ 4 = 6.

   - **If you chose A:** That multiplies, so it makes a bigger number. Divide asks what times 4 makes 24.
   - **If you chose B:** You took 4 away once. Divide asks how many 4s make 24.

M2.3.4. The 3, 4 and 8 times tables

1. **48**

   8 × 6 is double 4 × 6. 24 + 24 = 48.

   - **If you chose B:** You added 4. Eight groups is double four groups, so double 24.
   - **If you chose C:** You took half. 8 is more than 4, so the answer is more than 24.

2. **27**

   Count in 3s nine times. You say 3, 6, 9 and so on, up to 27.

3. **4, 8, 12, 16, 20, 24, 28, 32, 36, 40**

   Count in 4s ten times. Each answer is 4 more than the last.

4. **3 stones**

   8 × 3 = 24, so 24 ÷ 8 = 3.

   - **If you chose B:** You took 8 away. Sharing means dealing out equally. Think: 8 times what is 24? Go to M2.3.3.
   - **If you chose C:** The 8 is the number of friends. Each friend gets fewer than 8. Go to M2.3.3.

5. **56**

   4 × 7 = 28. Double it: 28 + 28 = 56.

   - **If you chose A:** 54 is 6 × 9. Double 4 × 7 instead: 28 + 28.
   - **If you chose C:** 64 is 8 × 8. You need 8 sevens, not 8 eights.

6. **15**

   Each number is 3 more than the last. 12 + 3 = 15. So 5 × 3 = 15.

   - **If you chose A:** You added 1. Counting in 3s adds 3 each time.
   - **If you chose B:** You added 4. That is counting in 4s. Counting in 3s adds 3 each time.

7. **24**

   Count in 4s six times: 4, 8, 12, 16, 20, 24. So 6 × 4 = 24.

   - **If you chose B:** You added 6 and 4. Times means 6 groups of 4. Go to M2.3.1.
   - **If you chose C:** That is 5 groups of 4. Count one more 4 to reach 6 groups.

8. **8, 6, 4, 2, 0**

   The last digit of 8 is 8. Of 16 it is 6. Of 24 it is 4. Of 32 it is 2. Of 40 it is 0.

   - **If you chose A:** Those are the first digits. The last digit is on the right: 16 ends in 6.
   - **If you chose C:** The last digit changes each time. 16 ends in 6, and 24 ends in 4.

9. **40**

   Each array is 4 × 5 = 20. Double it: 20 + 20 = 40. So 8 × 5 = 40.

   - **If you chose A:** That is one array. 8 × 5 is both arrays together.
   - **If you chose B:** You added 8 and 5. Times means 8 groups of 5. Go to M2.3.1.

M2.3.5. The 6, 7 and 9 times tables

1. **48**

   3 × 8 = 24. Double 24 is 48. So 6 × 8 = 48.

   - **If you chose B:** You may have 6 × 7 in mind. Double 3 × 8 = 24 is 48.
   - **If you chose C:** You added 6 + 8. Times means 6 equal groups of 8. Go to M2.3.1.

2. **54**

   10 × 6 = 60. Take away one 6. 60 − 6 = 54.

3. **56 stones**

   7 bags of 8 is 7 × 8. That is 5 × 8 plus 2 × 8. 40 + 16 = 56.

4. **No. 9 × 4 = 36.**

   10 × 4 = 40. Take away one 4. 40 − 4 = 36.

   - **If you chose A:** That is the eights. 9 × 4 is one more group of 4 than that.
   - **If you chose C:** You took away 9 from 40. Take away one group of 4, not 9.

5. **48**

   Eight is double four. Double 24 is 48. So 8 × 6 = 48.

6. **45**

   10 rows of 5 is 50. Take away one row of 5. 50 − 5 = 45. That is 9 × 5.

   - **If you chose A:** You took away 9. The shaded row has 5 dots, so take away 5.
   - **If you chose B:** You took away one dot. The shaded row has 5 dots, so take away 5.

7. **42**

   5 × 6 = 30 and 2 × 6 = 12. 30 + 12 = 42.

   - **If you chose A:** You added 7 and 6. Times means 7 groups of 6. Go to M2.3.1.
   - **If you chose C:** That is only 5 × 6. Add 2 × 6 = 12 as well.

8. **27 + 27 = 54**

   Six is double three. Double 27 is 27 + 27 = 54. So 6 × 9 = 54.

   - **If you chose A:** You added the 6. Six is double three, so double 27.
   - **If you chose B:** That is 4 × 9, one more group of 9. Six groups is double three groups.

M2.3.6. Times and divide facts together

1. **20 ÷ 5 = 4**

   The numbers are 4, 5 and 20. 20 ÷ 5 = 4 uses all three.

   - **If you chose B:** That uses 2 and 10. A family uses the same three numbers: 4, 5 and 20.
   - **If you chose C:** You added. A fact family uses times and divide, with the same three numbers.

2. **7**

   Ask: 6 times what makes 42? 7 × 6 = 42. So 42 ÷ 6 = 7.

3. **5 × 8 = 40, 8 × 5 = 40, 40 ÷ 5 = 8, 40 ÷ 8 = 5**

   40 is the biggest number. It is the answer to the times facts. It comes first in the divide facts.

4. **No. They are both 24.**

   Times can swap places. 6 × 4 = 24 and 4 × 6 = 24.

   - **If you chose A:** Turn the array. 6 rows of 4 becomes 4 rows of 6. The dots do not change. Go to M2.3.1.
   - **If you chose B:** You added. 6 × 4 means 6 groups of 4, which is 24. Go to M2.3.1.

5. **72**

   10 × 8 = 80. Take away one 8. 80 − 8 = 72.

6. **2 × 9 = 18, 9 × 2 = 18, 18 ÷ 2 = 9, 18 ÷ 9 = 2**

   18 is the biggest number. It is the answer to the times facts. It comes first in the divide facts.

   - **If you chose B:** The biggest number comes first in a divide fact. 2 ÷ 18 does not make 9.
   - **If you chose C:** That is a family for adding, with 2, 9 and 11. This family uses times and divide.

7. **8**

   Ask: 6 times what makes 48? 6 × 8 = 48. So 48 ÷ 6 = 8.

   - **If you chose A:** You took 6 away. Divide asks: 6 times what makes 48?
   - **If you chose C:** The 6 is what you divide by. Ask: 6 times what makes 48?

8. **24 ÷ 3 = 8**

   The picture has 24 dots. Share them between 3 friends. Each gets 8, because 3 × 8 = 24.

   - **If you chose A:** Divide cannot swap places. The biggest number comes first.
   - **If you chose B:** You took 3 away. Sharing between 3 friends asks you to divide.

9. **No. Times can swap places but divide cannot.**

   20 ÷ 5 = 4. Share 5 stones between 20 friends and nobody gets a whole stone.

   - **If you chose A:** Only times can swap places. 20 stones for 5 friends is not 5 stones for 20 friends.
   - **If you chose B:** Times can swap places. 6 × 4 and 4 × 6 are both 24. Divide cannot.

M2.3.7. Remainders

1. **2**

   3 groups of 6 use 18 stones. 20 − 18 = 2 left over.

   - **If you chose B:** That is the number of full groups. 3 groups of 6 use 18 stones. Now take 18 from 20.
   - **If you chose C:** You took away one group of 6. Keep making groups until no full group is left.

2. **5 groups, remainder 4**

   5 × 5 = 25. 29 − 25 = 4. The remainder is smaller than 5, so it is right.

3. **4 boats**

   23 ÷ 6 = 3, remainder 5. Five children still need a boat. Round up to 4.

   - **If you chose B:** You dropped the remainder. 5 children would have no boat. Round up.
   - **If you chose C:** Four boats hold 24 children. That is enough for 23.

4. **3 bundles**

   23 ÷ 6 = 3, remainder 5. Five sticks cannot make a full bundle. Round down to 3.

5. **6 beans each**

   24 ÷ 4 = 6, because 4 × 6 = 24. Nothing is left over.

6. **3**

   The remainder is always smaller than the group size. Only 3 is smaller than 5.

   - **If you chose A:** With 5 left over you could make one more group. A remainder is smaller than the group.
   - **If you chose C:** With 7 left over you could make one more group of 5. A remainder is smaller than 5.

7. **4 pots**

   4 × 7 = 28. 31 − 28 = 3 beans are left. Only full pots count, so round down to 4.

   - **If you chose A:** You rounded up. A 5th pot would hold only 3 beans. It is not full.
   - **If you chose B:** The 3 is the remainder, the beans left over. Count the full pots instead.

8. **3 boats**

   11 ÷ 4 = 2, remainder 3. Three people still need a boat. Round up to 3.

   - **If you chose A:** You dropped the remainder. 3 people would be left on the bank. Round up.
   - **If you chose B:** The 4 is how many one boat holds. Count how many boats everyone needs.

9. **20**

   5 × 4 = 20. So 5 groups of 4 use all 20. None are left over.

   - **If you chose A:** 14 is even, but 3 groups of 4 use 12. Two are left over.
   - **If you chose B:** 34 ends in 4. It is not in the 4 times table. 8 groups of 4 use 32. Two are left over.

M2.3.8. Times and divide with bigger numbers

1. **460**

   4 tens and 6 ones become 4 hundreds and 6 tens. The ones place holds 0.

   - **If you chose B:** You added 10. Times 10 moves every digit one place left.
   - **If you chose C:** You wrote 10 after the 46. Move the digits left and put 0 in the ones place.

2. **600 beans**

   Times 100 moves the 6 two places left, from ones to hundreds. 6 × 100 = 600.

3. **96**

   30 × 3 = 90. 2 × 3 = 6. 90 + 6 = 96.

4. **17**

   40 ÷ 4 = 10. 28 ÷ 4 = 7. 10 + 7 = 17.

5. **8**

   Ask: 7 times what makes 56? 8 × 7 = 56. So 56 ÷ 7 = 8.

6. **400**

   Times 100 moves each digit two places left. The 4 moves from ones to hundreds. 4 × 100 = 400.

   - **If you chose A:** That is times 10, one place left. Times 100 moves the 4 two places left.
   - **If you chose B:** You wrote 100 after the 4. Move the 4 two places left. Fill the empty places with 0.

7. **102**

   Split 34 into 30 and 4. 30 × 3 = 90. 4 × 3 = 12. 90 + 12 = 102.

   - **If you chose A:** You wrote 9 and 12 side by side. The 3 is 3 tens: 30 × 3 = 90. Then add 4 × 3 = 12.
   - **If you chose B:** You forgot that the 3 is 3 tens. 30 × 3 = 90, not 9. Then add 4 × 3 = 12.

8. **32**

   90 ÷ 3 = 30. 6 ÷ 3 = 2. 30 + 2 = 32.

   - **If you chose A:** You wrote 30 and 2 side by side. Add them: 30 + 2.
   - **If you chose C:** That is only 90 ÷ 3. Divide the 6 by 3 as well, and add.

9. **42**

   Each group is 1 ten and 4 ones, which is 14. 3 × 10 = 30 and 3 × 4 = 12. 30 + 12 = 42.

   - **If you chose A:** You wrote 3 and 12 side by side. 3 × 10 = 30 and 3 × 4 = 12. Add them.
   - **If you chose C:** You added 3 and 14. Times means 3 groups of 14. Go to M2.3.1.

About this book

For learners who can count in 2s, 5s and 10s and add numbers to 100. In many schools this fits children of about 8 to 10, and older learners who never learned their tables can start here too. Each chapter takes one or two short sessions. A learner can work alone: every exercise has its answer and the reason for it.

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