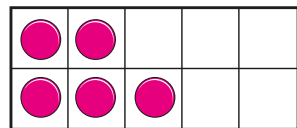# Multiples
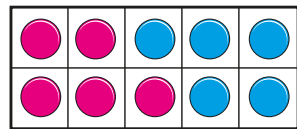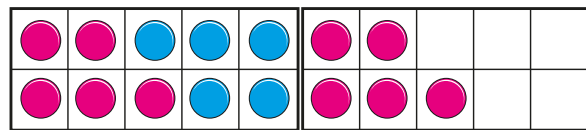
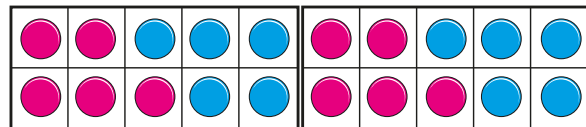**1** What numbers are represented?

Complete the sentence.

These numbers are all _____ of 5

2 Complete the number track.

0	6				30				54	

3 a) List all the multiples of 2 up to 20

_____

b) List all the multiples of 4 up to 20

_____

c) What do you notice about the multiples of 2 and 4?

d) Is the number 47 a multiple of 4? _____

Explain how you know.

_____

_____

4 a) Circle all the multiples of 3

23   6   13   18   21   32

b) The table shows four more multiples of 3

Multiple of 3	75	126	432	9,735
Sum of the digits				

What do you notice about the sum of the digits in each number?

_____

_____

5 Multiples of 5 always have a 5 in the number.

Is the statement true or false? _____

Explain your answer.

_____

_____

6 Which number is the odd one out?

Tick your answer.

| 8 | 56 | 6 | 16 |

Explain to a partner why it is the odd one out.

7 Here is part of a hundred square.

11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

a) Colour the multiples of 3

b) Draw a circle around all the multiples of 2

c) Some numbers have been coloured **and** circled.

What do you notice about these numbers?

8 Rosie and Jack are each thinking of a number.

My number is a multiple of 3 and 5

My number is a multiple of 2 and 10
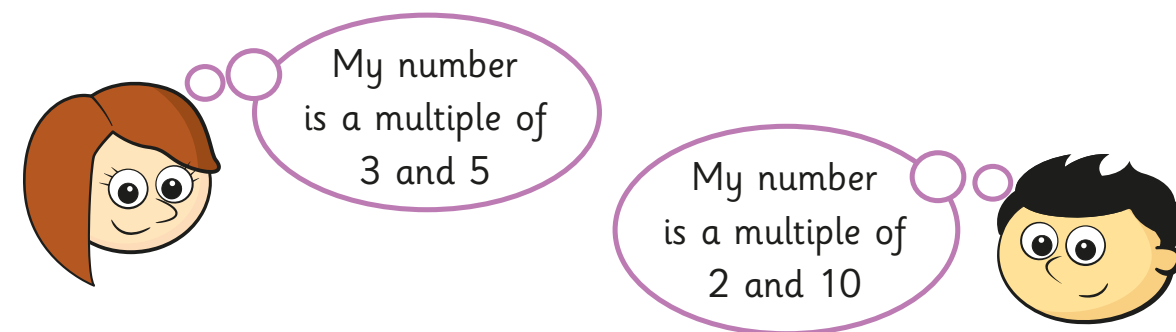
Could they be thinking of the same number? _____

Explain your answer.

_____

_____

9 Scott's age is a multiple of 8 and 12

His age is one away from a multiple of 7
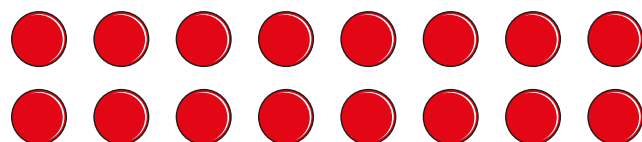
He is younger than 50 years old.

How old is Scott?

10 Write the multiples of 15 between 250 and 350

_____

_____

Compare answers with a partner to make sure you have them all.
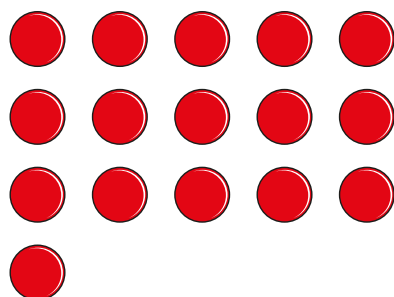
Factors

1 Alex arranges 16 counters in different ways.

She is trying to work out some factors.

a) Use the array to complete the sentence.

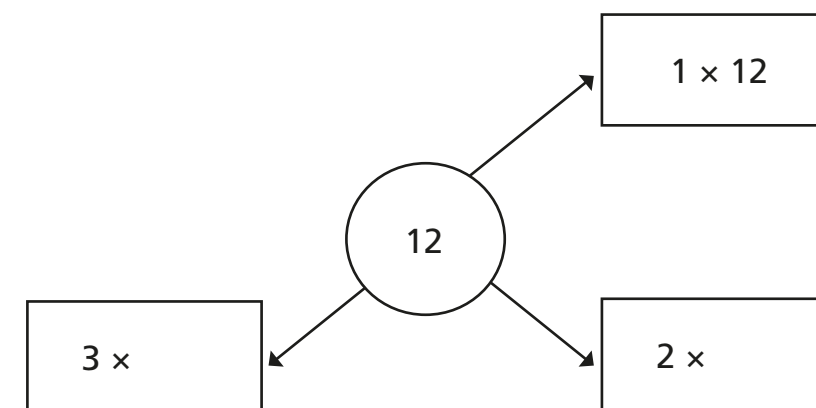[ ] and [ ] are both factors of 16

b) Alex rearranges the counters.

How does this array show that 5 is not a factor of 16?

_____

_____

2 Use 20 counters.

a) Show that 2 and 10 are factors of 20

b) Rearrange the counters to show why 4 and 5 are also factors of 20

c) Show why 6 is not a factor of 20

3 **a)** Complete the diagram to show the pairs of numbers that multiply to make 12

List all the factors of 12

_____

b) Draw a similar diagram to show the pairs of numbers that multiply to make 24

List all the factors of 24

_____

4 **a)** List all the factors of 32

_____

b) How can you check that you have found all the factors?

5 **a)** Circle the factors of 30

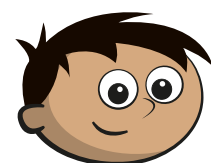 5   15   25   3   30   4   2   12   60   0

b) These numbers are all factors of a 2-digit number.

  1   3   5   9
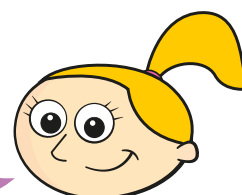
What could the number be? ☐

6 Amir and Eva are describing numbers using factors.

Amir: The number 11 does not have any factors.

Eva: My number lies between 20 and 25. It only has two factors.

a) Is Amir correct? _____

Explain your answer.

_____

_____

b) What number is Eva thinking of? ☐

7 Which number has the most factors? Tick your answer.

  64   48

8 Look at each statement.

Explain the mistakes that have been made.

a) 20, 30 and 40 are all factors of 10

_____

_____

b) 0.5 is a factor of 8 as 16 halves equals 8

_____

_____

9 How do we know that these statements are true?

a) 5 is a factor of 195 but not a factor of 196

_____

_____

b) 3 is a factor of 177 but not a factor of 178

_____

_____

c) 20 is a factor of 180 but not a factor of 190

_____

_____

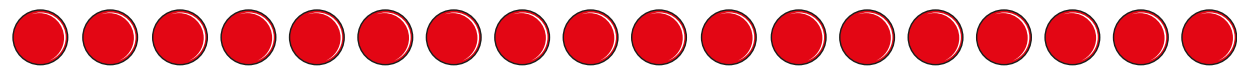**10** Is this statement always, sometimes or never true?

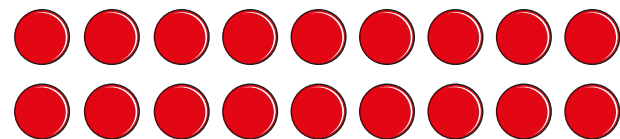A number will always have an even number of factors because factors come in factor pairs.

Common factors

1 Kim is using counters to find factors of 18

She arranges the counters in one row.

Then she arranges the counters in two rows.

a) Kim's array shows four numbers that are factors of 18

Which numbers are they?

☐ ☐ ☐ ☐

b) What are the two other factors of 18?

☐ ☐

c) Use counters to find the factors of 27

List the factors of 27

_____

d) List the common factors of 18 and 27

_____

Why are these numbers common factors?

2 Complete the sentences.

a) The factors of 24 are _____

The factors of 36 are _____
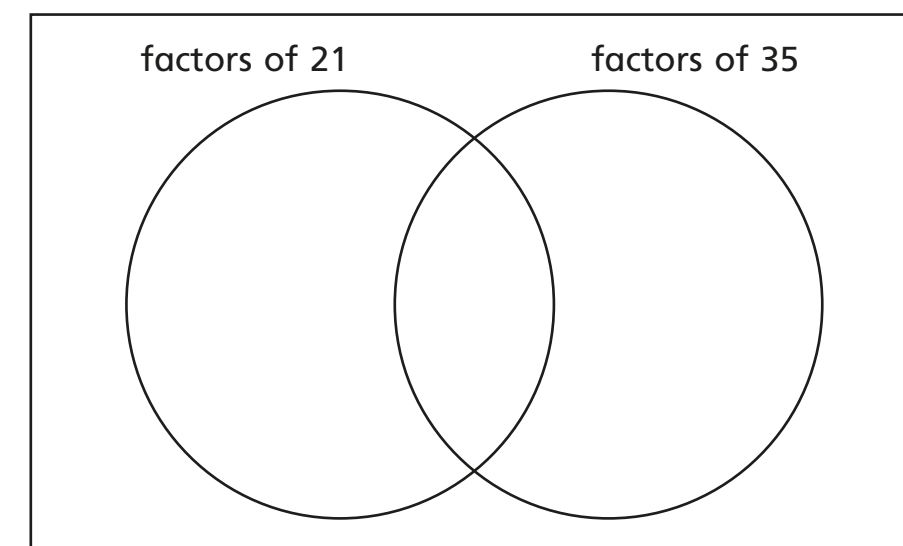
The common factors of 24 and 36 are _____

b) The factors of 30 are _____

The factors of 45 are _____

The common factors of 30 and 45 are _____

3 **a)** Write the numbers on the diagram.

| 1 | 3 | 5 | 7 | 21 | 35 |

factors of 21   factors of 35

b) What are the common factors of 21 and 35?

_____

c) How does the Venn diagram help you to list the common factors?

4 List the common factors of each pair of numbers.

a)

15	20

_____

b)

9	10

_____

5 Circle the pairs of numbers that have only one common factor.

2 and 6   3 and 8   15 and 12
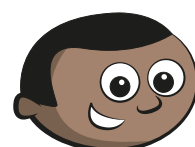
9 and 11   49 and 21   15 and 22

What do you notice?

6

All the factors of 36 are common factors of 36 and 72

Do you agree with Mo? _____

Explain your reasoning.

_____

_____

Why do you think this happens?

7 a) List the factors of 60 in order from lowest to highest.

_____

b) List the factors of 84 in order from smallest to greatest.

_____

c) What is the highest common factor of 60 and 84?

☐

8 Whitney bakes 24 cakes.

Dexter bakes 30 cakes.

Boxes can hold 2, 3, 4, 5, 6 or 10 cakes.

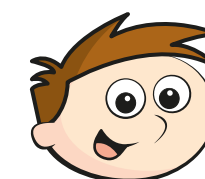Whitney and Dexter want to share their cakes equally into boxes.

a) Which boxes could Whitney use?

_____

b) Which boxes could Dexter use?

_____

c) Which boxes could they both use?

_____

Compare answers with a partner.

9

I am thinking of two numbers between 70 and 80. The common factors are 1, 2, 4 and 8

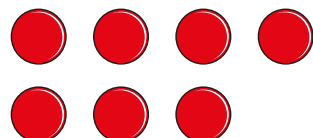What are the two numbers that Teddy is thinking of?

☐ and ☐

Prime numbers

1 Aisha makes different arrays with 7 counters.

She makes an array with 1 counter in each column.

She makes an array with 2 counters in a column.

a) Is it possible to arrange the counters in another way so that they make a rectangular array? _____

Draw counters to support your answer.

b) What are the factors of 7?

☐ and ☐

c) Explain why 7 is a prime number.

_____

_____

2 Complete the table.

Number	Factors	Is the number prime?
5	1 and 5	Yes
9		
11		
14		
15		
19		

3 A prime number has two factors: 1 and itself.

List the prime numbers up to 20

_____

4 Is 25 a prime number? _____

How do you know?

_____

_____

5 Here are sequences of consecutive prime numbers.
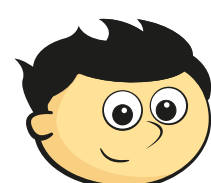
Complete the sequences.

a) 7, 11, 13, ☐ , 19

b) 37, 31, 29, ☐ , 19

6 Colour all the prime numbers.

51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

7 Here are some numbers.

| 126 | 175 | 2,378 | 777 | 381 | 9,000 |

Jack: The numbers are big. It's hard to check if they are prime.
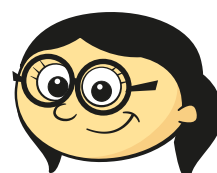
Annie: I can tell quickly that none of these numbers are prime.

How does Annie know that none of the numbers are prime?

_____

_____

_____

_____

Compare answers with a partner.

8 Mo and Alex are talking about prime numbers.

Mo: Prime numbers are always odd.
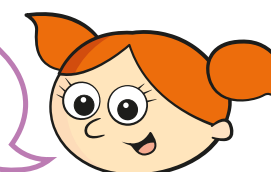
Alex: I think prime numbers can be even.

Who is correct? _____

How do you know?

_____

_____

9 Teddy writes five consecutive numbers.

Three of the numbers are prime.

What are the five consecutive numbers?

☐ , ☐ , ☐ , ☐ , ☐

10 Kim is thinking of a prime number.

It is in between a multiple of 11 and a factor of 48

What number is Kim thinking of?

☐

Square numbers

1 a) Use 16 counters to make these arrays.
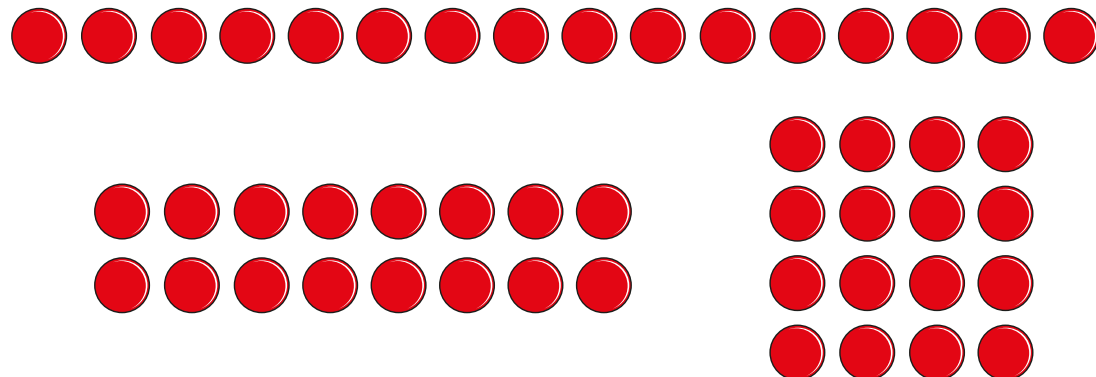
b) What do you notice about the shape of one of the arrays?

_____

c) Is 16 a square number? How do you know?

2 a) Is it possible to make a square array with 8 counters? _____

b) Is it possible to make a square array with 9 counters? _____

c) Which number is a square number?

How do you know?

_____

_____

3 Which of these numbers are square numbers?
Circle your answers.

<div align="center">

4   10   18   25

</div>

4 Dexter makes a square using 12 counters.

> 12 is a square number as I can make the counters into a square.

What mistake has Dexter made?

_____

_____

5 Whitney is working out a calculation.

$$8 \times 8 = 16$$

What mistake has Whitney made?

_____

_____

6 The arrays below show a sequence.
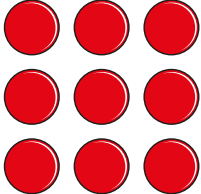
a) Complete the number sentences. Use the arrays to help you.
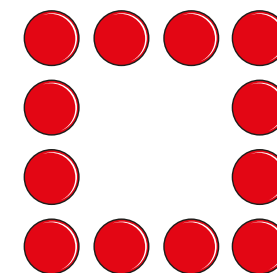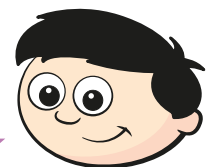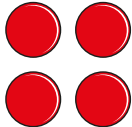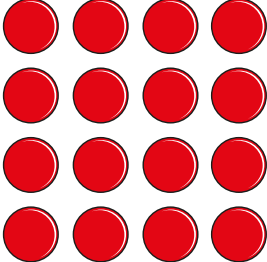
$1 \times 1 = \boxed{}$ $2 \times 2 = \boxed{}$ $3 \times \boxed{} = \boxed{}$ $\boxed{} \times \boxed{} = \boxed{}$

b) What do these numbers have in common?

_____

c) Draw the next two numbers in the sequence and write a number sentence for each.

d) What would the next four numbers in the sequence be?

$\boxed{}$, $\boxed{}$, $\boxed{}$, $\boxed{}$

7 Complete the statements.

a) $6^2 = \boxed{}$

d) $0^2 = \boxed{}$

b) $12^2 = \boxed{}$

e) $\boxed{}^2 = 100$

c) $\boxed{} = 9^2$

f) $64 = \boxed{}^2$

8 **a)** Write the numbers in the table.

0   3   4   11   49

	Factor of 24	Not a factor of 24
Square number		
Prime number		

b) Write a different number in each part of the table.

9 Dani is thinking of a square number with 2 digits.

The digits add together to make another square number.

What could the number be?

$\boxed{}$

10 Huan is celebrating his birthday.

His age is a square number.

Last year he was a multiple of 12

Next year he will be a multiple of 10

How old is Huan?

$\boxed{}$

Cube numbers

1 a) Fit 8 multilink cubes together to make a larger cube.
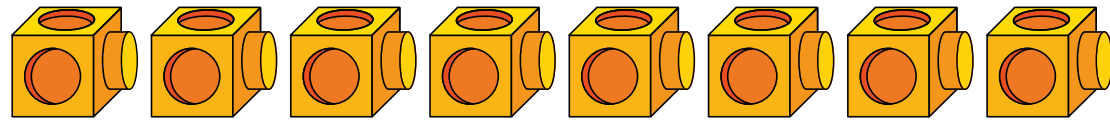
b) Is it possible to fit 9 multilink cubes together to make a larger cube? _____

Explain your answer.

_____

_____

2 Filip makes a cube using some smaller cubes.
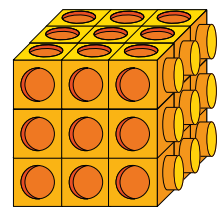
a) How many cubes make up this cube? ☐

b) How did you work out the number of cubes?

_____

_____

c) This number is an example of a cube number.

Why do you think it is a cube number?

3 a) Complete the table of cube numbers.

2^3	2 × 2 × 2	8
3^3	3 × 3 × 3	
4^3	4 × 4 × 4	

b) What would the next cube number in the table be?

$$\boxed{}^3 = \boxed{} \times \boxed{} \times \boxed{} = \boxed{}$$

4 Complete the statements.

Use the cubes to help you.
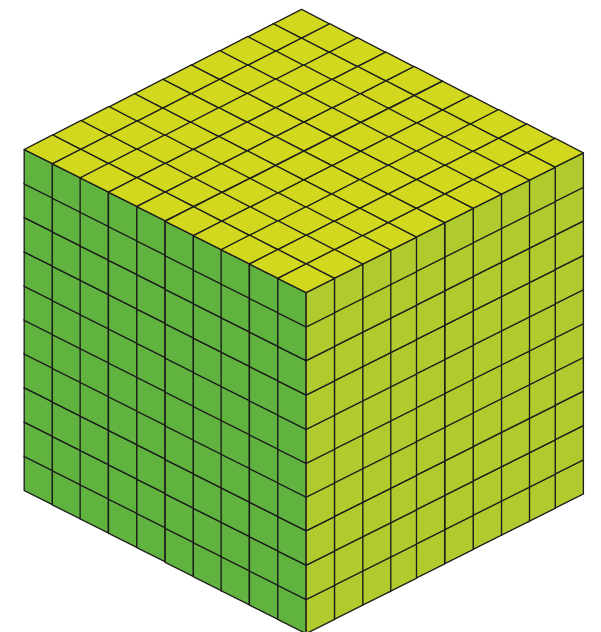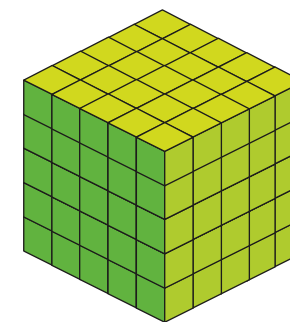
a) $5^3 = $ ☐

5 cubed = ☐

5 × 5 × 5 = ☐

b) $10^3 = $ ☐

10 cubed = ☐

10 × 10 × 10 = ☐

5 **a)** Which calculation is the same as 6^3?

Tick your answer.

6 × 3	6 + 6 + 6	6 × 6 × 6
☐	☐	☐

b) Kim has worked out 6^3 using this method.

$6^3 = (6 \times 6) \times 6$

$\quad = 36 \times 6$

$\quad = 216$

	30	6
6	30 × 6 = 180	6 × 6 = 36
	180 + 36 = 216	

Is Kim's method correct? _____

How do you know?

_____

_____

c) Match the cube numbers to the calculations.

One has been done for you.

4^3 4 × 2

5^3 9 × 3

2^3 16 × 4

3^3 25 × 5

6 Calculate 7^3

7 1³ is 1, and 3³ is 9
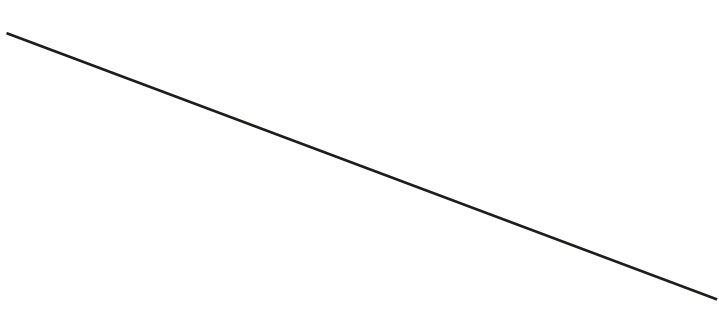
What mistake has Dora made?

Why might she have made this mistake?

_____

_____

8 Scott's age is a cube number.

His sister is 2 years younger than him.

Her age is a square number.

In 3 years, Scott's age will be a multiple of 10

How old is Scott?

Scott is ☐ years old.

Multiply by 10, 100 and 1,000

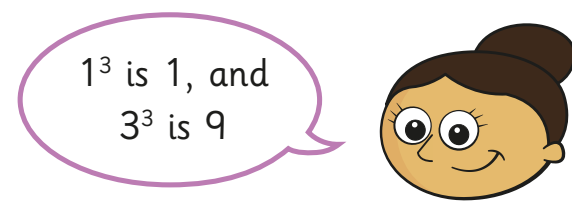**1** Complete the multiplications.

a)

Th	H	T	O
			7

$7 \times 10 =$

b)

Th	H	T	O
		3	9

$39 \times 10 =$

c)

Th	H	T	O
	2	0	5

$205 \times 10 =$

d) What happens to the digits when you multiply by 10?

_____

_____

2 Complete the multiplication sentences.

a) $9 \times 10 =$

b) $54 \times 10 =$

c) $10 \times 13 =$

d) $126 \times 10 =$

e) $\times 10 = 320$

f) $10 \times$ $= 1,350$

g) $20 \times 10 =$

h) $\times 10 = 5,000$

3 Multiply each number by 100 and then by 1,000

a)

HTh	TTh	Th	H	T	O
					9

$9 \times 100 =$

$9 \times 1,000 =$

b)

HTh	TTh	Th	H	T	O
				1	6

$16 \times 100 =$

$16 \times 1,000 =$

c)

HTh	TTh	Th	H	T	O
			2	4	5

$245 \times 100 =$

$245 \times 1,000 =$

d) Explain to a partner how you multiply a number by 100

Ask them to explain how to multiply by 1,000

4 Complete the multiplication sentences.

a) $45 \times 100 =$

$52 \times 100 =$

$70 \times 100 =$

b) $612 \times 100 =$

$715 \times 100 =$

$720 \times 100 =$

c) $41 \times 10 =$

$41 \times 100 =$

$41 \times 1,000 =$

d) $10 \times 952 =$

$100 \times 952 =$

$1,000 \times 952 =$

5 Write >, < or = to make the statements true.

a) 78 × 10 ◯ 78 × 100

b) 100 × 56 ◯ 65 × 100

c) 930 × 10 ◯ 100 × 93

d) 1,000 × 482 ◯ 482 × 100

6

> 54 × 1,000
> is the same as
> 54 × 10 × 10 × 10
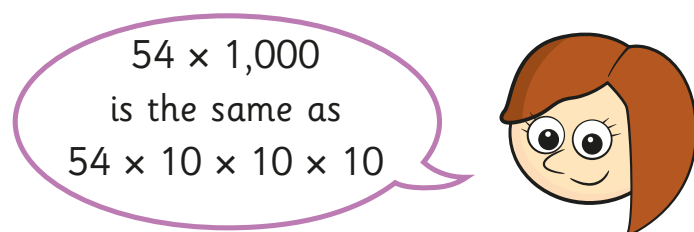
Is Rosie correct? _____

Explain how you know.

_____

_____

7 Complete the multiplication sentences.

a) 52 × [ ] = 5,200

b) 95 × [ ] = 950

c) 136 × [ ] = 1,360

d) 272 × [ ] = 272,000

e) 6,200 = [ ] × 62

f) [ ] × 370 = 3,700

g) [ ] × 100 = 8,200

h) [ ] × 100 = 82,000

i) [ ] × 10 = 39,000

j) 1,000 × [ ] = 80,000

8 Ron and Dani have paper rounds.

Ron delivers 75 papers a month.

Dani delivers 10 times as many papers a month as Ron.

How many papers do they deliver altogether?

[ ] papers

9 Mrs Hall owns a bookshop.

- In January, she sold 145 books.
- In February she sold 10 times as many books.
- In March she sold 10 times as many books as in February.

How many books did Mrs Hall sell in March?

Show your workings.

[ ]

Compare answers with a partner.

10 Amir thinks of a number.

He multiplies it by 100

The answer has the same digit in the thousands and hundreds columns.

The total of all the digits is 8

What could the number be?

[ ]

Divide by 10, 100 and 1,000

1 Complete the division sentences.

a)

Th	H	T	O
		6	0

$60 \div 10 = \boxed{}$

b)

Th	H	T	O
	4	9	0

$490 \div 10 = \boxed{}$

c)

Th	H	T	O
1	4	9	0

$1,490 \div 10 = \boxed{}$

d) What happens to the digits when you divide a number by 10?

_____

_____

2 Complete the division sentences.

a) $90 \div 10 = \boxed{}$

b) $750 \div 10 = \boxed{}$

c) $820 \div 10 = \boxed{}$

d) $\boxed{} = 1,460 \div 10$

e) $32,390 \div 10 = \boxed{}$

f) $6,200 \div 10 = \boxed{}$

g) $700 \div 10 = \boxed{}$

h) $92,000 \div 10 = \boxed{}$

3 Complete the divisions.

a)

HTh	TTh	Th	H	T	O
			9	0	0

$900 \div 100 = \boxed{}$

b)

HTh	TTh	Th	H	T	O
	1	6	0	0	0

$16,000 \div 100 = \boxed{}$

c)

HTh	TTh	Th	H	T	O
		9	0	0	0

$9,000 \div 1,000 = \boxed{}$

d)

HTh	TTh	Th	H	T	O
7	6	8	0	0	0

$768,000 \div 1,000 = \boxed{}$

4 Explain to a partner how to divide a number by 100

Ask them to explain to you how to divide a number by 1,000

5 Complete the division sentences.

a) $4,500 \div 10 = \boxed{}$

$62,000 \div 10 = \boxed{}$

$739,300 \div 10 = \boxed{}$

b) $4,500 \div 100 = \boxed{}$

$62,000 \div 100 = \boxed{}$

$739,300 \div 100 = \boxed{}$

c) $\boxed{} \div 10 = 76$

$\boxed{} \div 100 = 76$

$\boxed{} \div 1,000 = 76$

d) $\boxed{} \div 1,000 = 30$

$\boxed{} \div 1,000 = 300$

$\boxed{} \div 1,000 = 3,000$

6 Complete the table.

Number	Number divided by 10	Number divided by 100	Number divided by 1,000
65,000			
	7,200		
		3,500	

7 Write >, < or = to make the statements true.

a) 4,900 ÷ 10 ◯ 4,900 ÷ 100

b) 56,000 ÷ 100 ◯ 65,000 ÷ 100

c) 93,000 ÷ 1,000 ◯ 9,300 ÷ 100

d) 5,700 ÷ 100 ◯ 5,700 ÷ 1,000

8 Complete the sentences.

a) Dividing a number by 10 and then by 10 again is the same as

_____

_____

b) Dividing a number by 1,000 is the same as dividing by 10

and then _____

_____

Compare answers with a partner.

9 In 2019, 568,000 houses were built.

In 2018, 10 times fewer houses were built.

In 2017, 100 times fewer houses were built.

a) How many houses were built in 2018?

[_____] houses

b) How many houses were built in 2017?

[_____] houses

c) How many houses were built between 2017 and 2019?

[_____] houses

10 Alex is thinking of a number.

She divides it by 100

The answer has one more in the hundreds column than in the tens column.

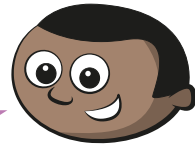The total of the digits is 15

What could the number be?

[_____]

How many different answers can you find?

Multiples of 10, 100 and 1,000

1 Mo is multiplying numbers by 20

> To multiply by 20, I multiply first by 2 and then by 10

a) Use Mo's method to complete the multiplication sentences.

$7 \times 20 =$ ◻

$12 \times 20 =$ ◻

$20 \times 134 =$ ◻

b) Would you get the same answer if you multiplied by 10 first and then by 2? _____

Write an example.

_____

_____

2 Complete the sentences.

a) To multiply by 50, you multiply by 5 first and then by ◻

b) To multiply by 200, you multiply by ◻ first and then by ◻

c) To multiply by 7,000 you multiply by ◻ first and then by ◻

3 Complete the multiplication sentences.

Show all the steps in your thinking.

a) $7 \times 500 =$ ◻

b) $6{,}000 \times 8 =$ ◻

c) $300 \times 90 =$ ◻

d) $500 \times 300 =$ ◻

4 Complete the calculations.

a) $300 \times$ ◻ $= 9{,}000$

b) $6{,}000 \times$ ◻ $= 18{,}000$

c) $700 \times$ ◻ $= 28{,}000$

d) ◻ $\times 90 = 27{,}000$

e) $500 \times 60 =$ ◻

f) $8{,}000 \times$ ◻ $= 720{,}000$

5

$$42 \times 3 = 126$$

Use this fact to solve the calculations.

a) $42 \times 30 =$ ◻

b) $420 \times 3 =$ ◻

c) $300 \times 42 =$ ◻

d) $42 \times 3{,}000 =$ ◻

6 Here are two methods to solve 16×50

Method 1	Method 2
$16 \times 10 \times 5$	$16 \times 5 \times 10$
$= 160 \times 5$	$= 80 \times 10$
$= 800$	$= 800$

a) What is the same about the methods?

What is different?

b) What other method could you use to multiply by 50?

Show your method.

_____

_____

_____

c) Share your method with a partner.

7 Jack and Mo are calculating $3,500 \div 70$

Jack's workings	Mo's workings
$3,500 \div 10 = 350$	$3,500 \div 10 = 350$
$350 \times 7 = 2,450$	$350 \div 7 = 50$

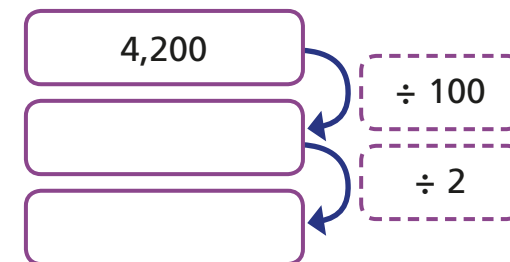a) Whose workings are correct? _____

b) What mistake has the other person made?

8 Complete the division diagrams.

a) $4,200 \div 200$

| 4,200 |
| |
| |

$\div 100$

$\div 2$

b) $36,000 \div 6,000$

| 36,000 |
| |
| |

Complete the division sentences.

c) $3,200 \div 80 = \boxed{}$

$3,200 \div 800 = \boxed{}$

d) $72,000 \div 9,000 = \boxed{}$

$72,000 \div 900 = \boxed{}$

$72,000 \div 90 = \boxed{}$

9 Match the calculations to the answers.

One has been done for you.

8×40		3,200
$3,200 \div 80$		320
4×800		40
$32,000 \div 40$		800

10 The answer is 400
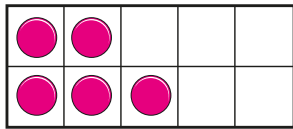
What could the question be?

Write 4 division and 4 multiplication questions.
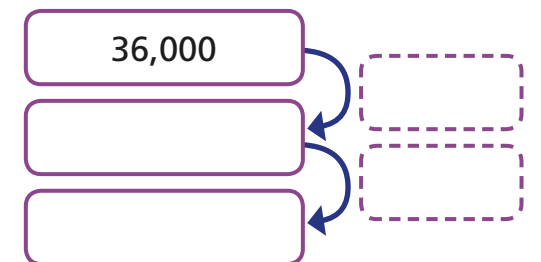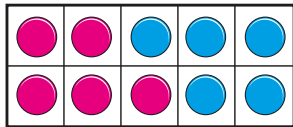
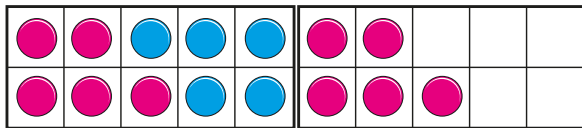Ask a partner to check your questions.
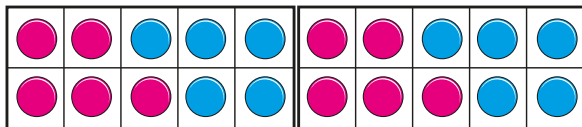
Multiples

1 What numbers are represented?

5

10

15

20

Complete the sentence.

These numbers are all __multiples__ of 5

2 Complete the number track.

| 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |

3 a) List all the multiples of 2 up to 20

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

b) List all the multiples of 4 up to 20

4, 8, 12, 16, 20

c) What do you notice about the multiples of 2 and 4?

d) Is the number 47 a multiple of 4? __No__

Explain how you know.

All multiples of 4 are even.

4 a) Circle all the multiples of 3

23   6   13   18   21   32

b) The table shows four more multiples of 3

Multiple of 3	75	126	432	9,735
Sum of the digits	12	9	9	24

What do you notice about the sum of the digits in each number?

They are multiples of 3

5 Multiples of 5 always have a 5 in the number.

Is the statement true or false? _false_

Explain your answer.

10 is a multiple of 5 and
doesn't have a 5 in the number.

6 Which number is the odd one out?

Tick your answer.

Various answers e.g.

| 8 | 56 | 6 ✓ | 16 |

Explain to a partner why it is the odd one out.

7 Here is part of a hundred square.

11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

a) Colour the multiples of 3

b) Draw a circle around all the multiples of 2

c) Some numbers have been coloured **and** circled.

What do you notice about these numbers?

8 Rosie and Jack are each thinking of a number.

My number is a multiple of 3 and 5

My number is a multiple of 2 and 10
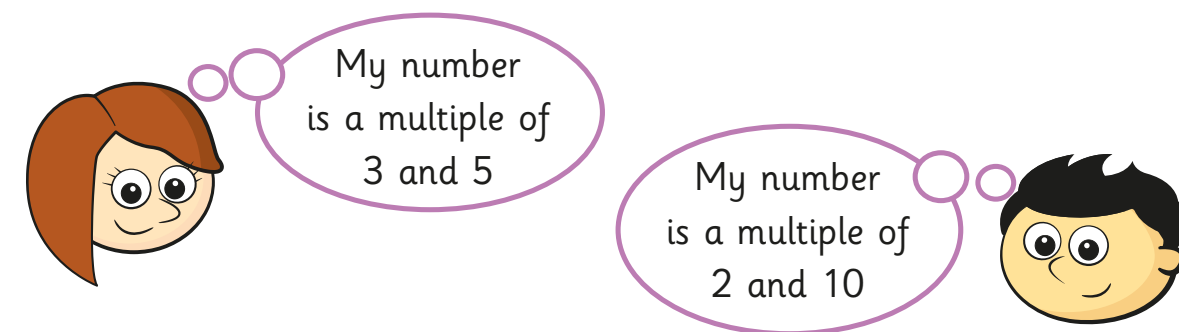
Could they be thinking of the same number? _Yes_

Explain your answer.

They could be thinking of 30, 60 etc.

9 Scott's age is a multiple of 8 and 12

His age is one away from a multiple of 7

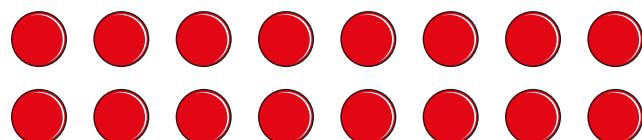He is younger than 50 years old.

How old is Scott?

_48_

10 Write the multiples of 15 between 250 and 350

_255   270   285   300   315   330   345_

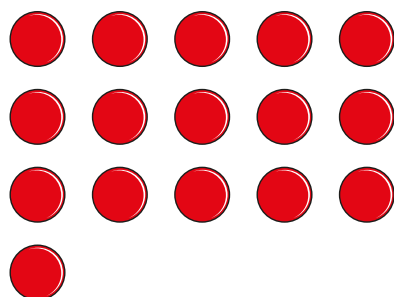Compare answers with a partner to make sure you have them all.

1 Alex arranges 16 counters in different ways.

She is trying to work out some factors.

a) Use the array to complete the sentence.

[2] and [8] are both factors of 16

b) Alex rearranges the counters.

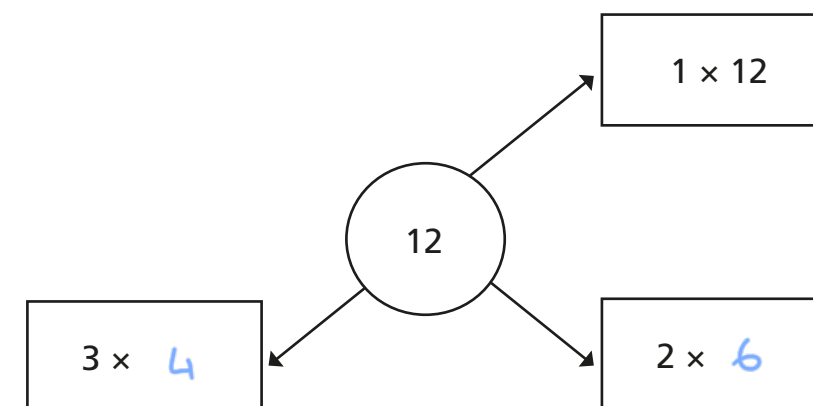How does this array show that 5 is not a factor of 16?

The bottom row isn't complete.

2 Use 20 counters.

a) Show that 2 and 10 are factors of 20

b) Rearrange the counters to show why 4 and 5 are also factors of 20
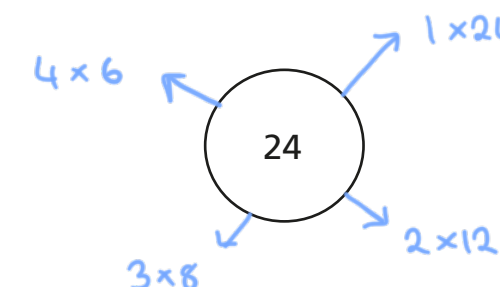
c) Show why 6 is not a factor of 20

3 a) Complete the diagram to show the pairs of numbers that multiply to make 12

1 × 12

12

3 × 4

2 × 6

List all the factors of 12

1, 2, 3, 4, 6, 12

b) Draw a similar diagram to show the pairs of numbers that multiply to make 24

4 × 6

24

1 × 24

3 × 8

2 × 12

List all the factors of 24

1, 2, 3, 4, 6, 8, 12, 24

4 a) List all the factors of 32

1, 2, 4, 8, 16, 32

b) How can you check that you have found all the factors?

5 a) Circle the factors of 30
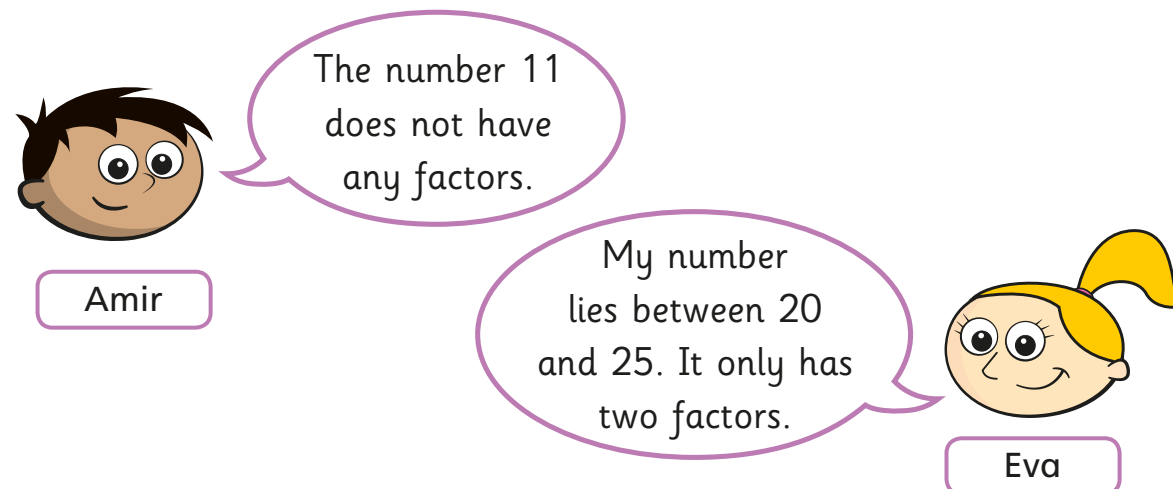
(5) (15) 25 (3) (30) 4 (2) 12 60 0

b) These numbers are all factors of a 2-digit number.

1 3 5 9

What could the number be? **45**

6 Amir and Eva are describing numbers using factors.

The number 11 does not have any factors.

Amir

My number lies between 20 and 25. It only has two factors.

Eva

a) Is Amir correct? __No__

Explain your answer.

$1 \times 11 = 11$ so 1 and 11 are factors

b) What number is Eva thinking of? **23**

7 Which number has the most factors? Tick your answer.

64   48 ✓

8 Look at each statement.

Explain the mistakes that have been made.

a) 20, 30 and 40 are all factors of 10

These are multiples not factors.

b) 0.5 is a factor of 8 as 16 halves equals 8

Factors have to be integers.

9 How do we know that these statements are true?

a) 5 is a factor of 195 but not a factor of 196

195 ends in 5 so 5 is a factor. 196 is one more than a multiple of 5 so 5 isn't a factor.

b) 3 is a factor of 177 but not a factor of 178

$1 + 7 + 7 = 15$ 15 is a multiple of 3 so 3 is a factor of 177 therefore not a factor of 178

c) 20 is a factor of 180 but not a factor of 190

$180 \div 20 = 9$ 190 is 10 more than 180 so 20 can't be a factor.

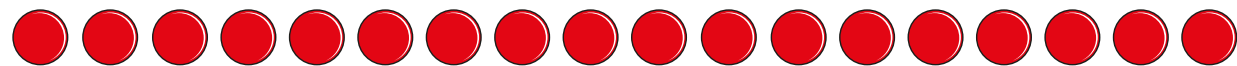**10** Is this statement always, sometimes or never true?

A number will always have an even number of factors because factors come in factor pairs.
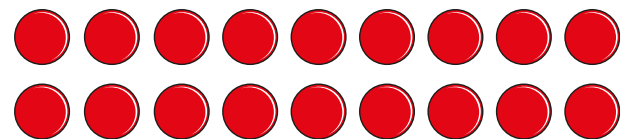
Common factors

1 Kim is using counters to find factors of 18

She arranges the counters in one row.

Then she arranges the counters in two rows.

a) Kim's array shows four numbers that are factors of 18

Which numbers are they?

| 1 | 2 | 9 | 18 |

b) What are the two other factors of 18?

| 3 | 6 |

c) Use counters to find the factors of 27

List the factors of 27

1   3   9   27

d) List the common factors of 18 and 27

1   3   9

Why are these numbers common factors?

2 Complete the sentences.

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

The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, 36
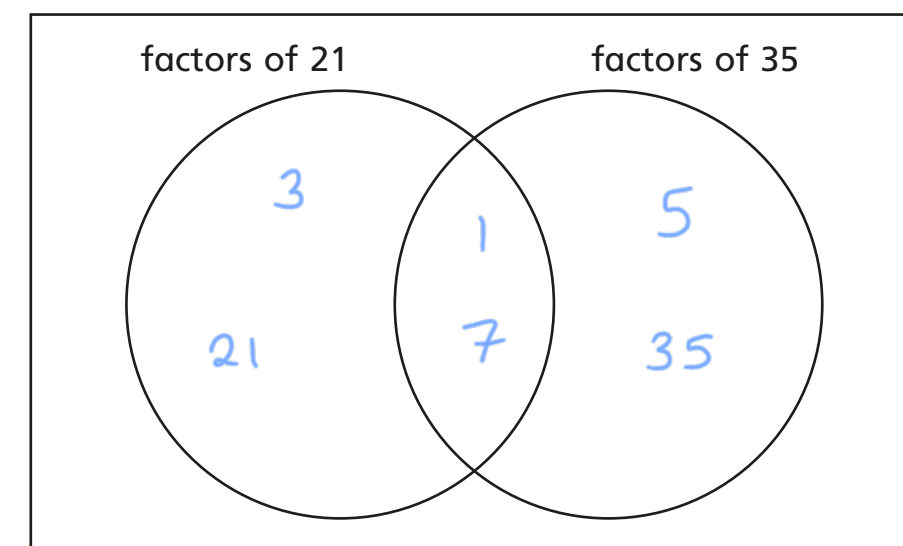
The common factors of 24 and 36 are 1, 2, 3, 4, 6, 12

b) The factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30

The factors of 45 are 1, 3, 5, 9, 15, 45

The common factors of 30 and 45 are 1, 3, 5, 15

3 a) Write the numbers on the diagram.

1   3   5   7   21   35

factors of 21   factors of 35

3   1   5
21   7   35

b) What are the common factors of 21 and 35?

1, 7

c) How does the Venn diagram help you to list the common factors?

4 List the common factors of each pair of numbers.

a)

| 15 | 20 |

_1, 5_

b)

| 9 | 10 |

_1_

5 Circle the pairs of numbers that have only one common factor.

2 and 6   (3 and 8)   15 and 12
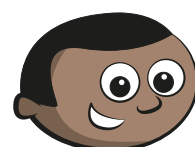
(9 and 11)   49 and 21   (15 and 22)

What do you notice?

6

All the factors of 36 are common factors of 36 and 72

Do you agree with Mo? _Yes_

Explain your reasoning.

36 is a factor of 72 therefore all of its factors

are factors of 72

Why do you think this happens?

7 a) List the factors of 60 in order from lowest to highest.

_1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60_

b) List the factors of 84 in order from smallest to greatest.

_1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84_

c) What is the highest common factor of 60 and 84? | 12 |

8 Whitney bakes 24 cakes.

Dexter bakes 30 cakes.

Boxes can hold 2, 3, 4, 5, 6 or 10 cakes.

Whitney and Dexter want to share their cakes equally into boxes.

a) Which boxes could Whitney use?

_2, 3, 4, 6_
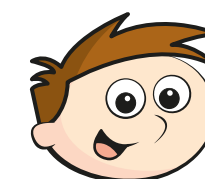
b) Which boxes could Dexter use?

_2, 3, 5, 6, 10_

c) Which boxes could they both use?

_2, 3, 6_

Compare answers with a partner.

9

I am thinking of two numbers between 70 and 80. The common factors are 1, 2, 4 and 8

What are the two numbers that Teddy is thinking of?
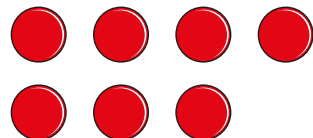
| 72 | and | 80 |

Prime numbers

1 Aisha makes different arrays with 7 counters.

She makes an array with 1 counter in each column.

She makes an array with 2 counters in a column.

a) Is it possible to arrange the counters in another way so that they make a rectangular array? ___No___

Draw counters to support your answer.

b) What are the factors of 7?

$\boxed{1}$ and $\boxed{7}$

c) Explain why 7 is a prime number.

It only has two factors, 1 and itself.

2 Complete the table.

Number	Factors	Is the number prime?
5	1 and 5	Yes
9	1, 3, 9	No
11	1, 11	Yes
14	1, 2, 7, 14	No
15	1, 3, 5, 15	No
19	1, 19	Yes

3 A prime number has two factors: 1 and itself.

List the prime numbers up to 20

2, 3, 5, 7, 11, 13, 17, 19

4 Is 25 a prime number? ___No___

How do you know?

$5 \times 5 = 25$

5 Here are sequences of consecutive prime numbers.
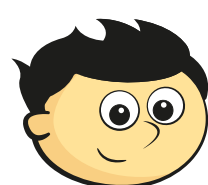
Complete the sequences.

a) 7, 11, 13, $\boxed{17}$, 19

b) 37, 31, 29, $\boxed{23}$, 19

6 Colour all the prime numbers.

51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

(53, 59, 61, 67, 71, 73, 79 coloured)

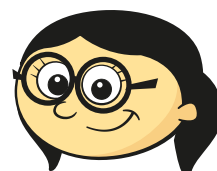**7** Here are some numbers.

126	175	2,378	777	381	9,000

Jack: The numbers are big. It's hard to check if they are prime.

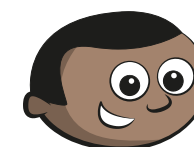Annie: I can tell quickly that none of these numbers are prime.

How does Annie know that none of the numbers are prime?

126, 2378 and 9000 have 2 as a factor so aren't prime. 175 has 5 as a factor. 777 has 7 as a factor. 3+8+1 = 12 so 3 is a factor of 381
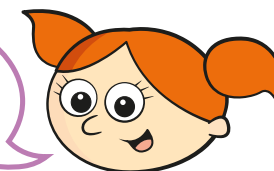
Compare answers with a partner.

8 Mo and Alex are talking about prime numbers.

Mo: Prime numbers are always odd.

Alex: I think prime numbers can be even.

Who is correct? ___Alex___

How do you know?

2 is even and prime. It is the only even prime number.

9 Teddy writes five consecutive numbers.

Three of the numbers are prime.

What are the five consecutive numbers?

| 2 |,| 3 |,| 4 |,| 5 |,| 6 |

10 Kim is thinking of a prime number.

It is in between a multiple of 11 and a factor of 48
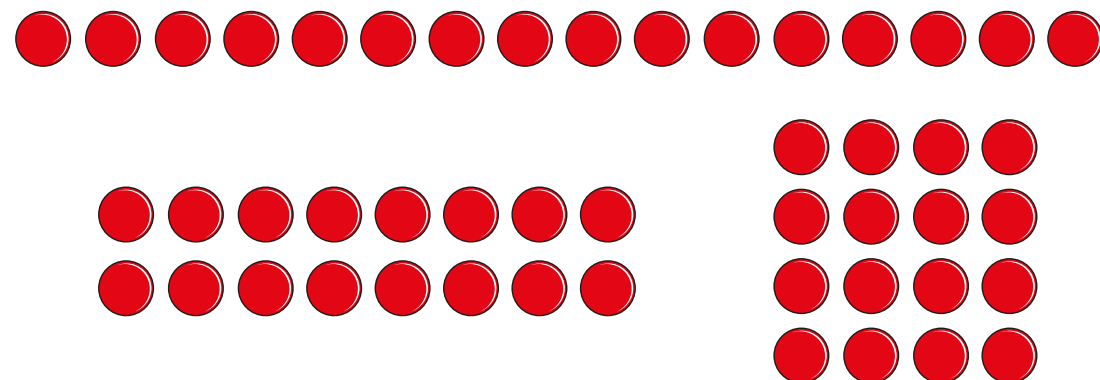
What number is Kim thinking of?

23

Square numbers

1 **a)** Use 16 counters to make these arrays.

b) What do you notice about the shape of one of the arrays?

It's a square.

c) Is 16 a square number? How do you know?

2 **a)** Is it possible to make a square array with 8 counters? No

b) Is it possible to make a square array with 9 counters? Yes

c) Which number is a square number? 9

How do you know?

You can make a square array using 9 counters.

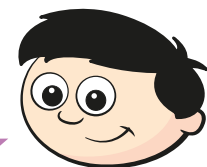**3** Which of these numbers are square numbers? Circle your answers.

④ 10 18 ㉕

4 Dexter makes a square using 12 counters.
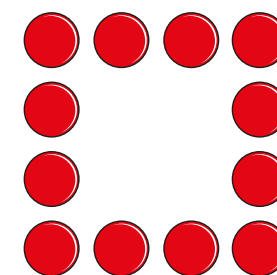
12 is a square number as I can make the counters into a square.

What mistake has Dexter made?

His square is incomplete.

5 Whitney is working out a calculation.

8 × 8 = 16
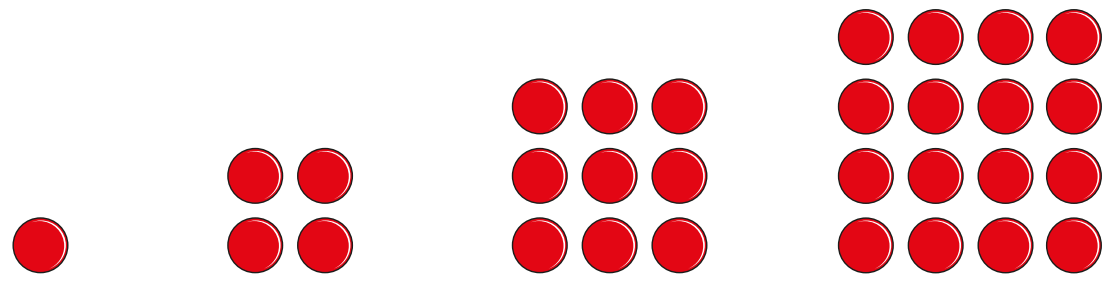
What mistake has Whitney made?

She has done 8 + 8
It should be 64

6 The arrays below show a sequence.

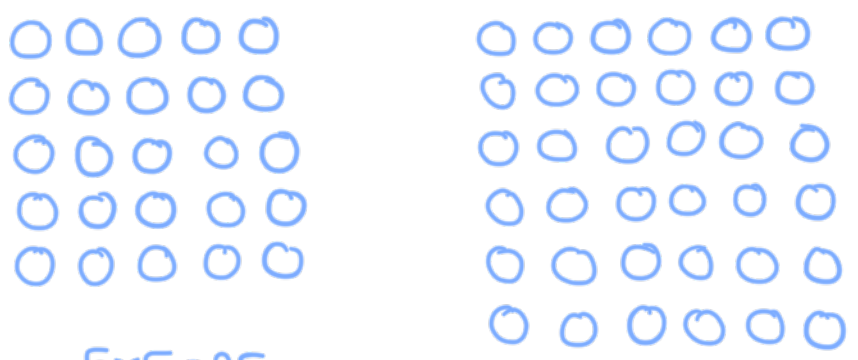**a)** Complete the number sentences. Use the arrays to help you.

$1 \times 1 = \boxed{1}$ $2 \times 2 = \boxed{4}$ $3 \times \boxed{3} = \boxed{9}$ $\boxed{4} \times \boxed{4} = \boxed{16}$

b) What do these numbers have in common?

They're all square numbers.

c) Draw the next two numbers in the sequence and write a number sentence for each.

$5 \times 5 = 25$

$6 \times 6 = 36$

d) What would the next four numbers in the sequence be?

$\boxed{49}$, $\boxed{64}$, $\boxed{81}$, $\boxed{100}$

7 Complete the statements.

a) $6^2 = \boxed{36}$

d) $0^2 = \boxed{0}$

b) $12^2 = \boxed{144}$

e) $\boxed{10}^2 = 100$

c) $\boxed{81} = 9^2$

f) $64 = \boxed{8}^2$

8 a) Write the numbers in the table.

0   3   4   11   49

	Factor of 24	Not a factor of 24
Square number	4	0 49
Prime number	3	11

b) Write a different number in each part of the table.

9 Dani is thinking of a square number with 2 digits.

The digits add together to make another square number.
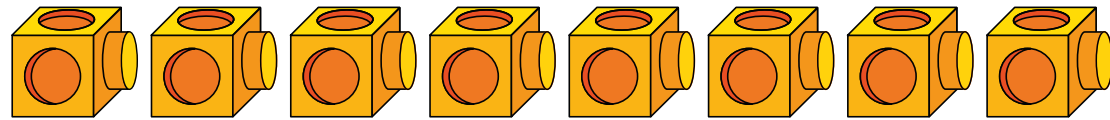
What could the number be?

$\boxed{36}$

10 Huan is celebrating his birthday.

His age is a square number.

Last year he was a multiple of 12

Next year he will be a multiple of 10

How old is Huan?

$\boxed{49}$

Cube numbers

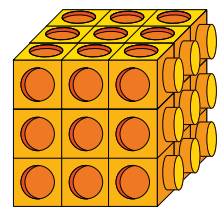**1** **a)** Fit 8 multilink cubes together to make a larger cube.

b) Is it possible to fit 9 multilink cubes together to make a larger cube?   No

Explain your answer.

There will be one cube sticking out.

2 Filip makes a cube using some smaller cubes.

a) How many cubes make up this cube?   27

b) How did you work out the number of cubes?

3 × 3 × 3 = 27

c) This number is an example of a cube number.

Why do you think it is a cube number?

3 **a)** Complete the table of cubed numbers.

2^3	2 × 2 × 2	8
3^3	3 × 3 × 3	27
4^3	4 × 4 × 4	64

b) What would the next cube number in the table be?

5^3 = 5 × 5 × 5 = 125

4 Complete the statements.

Use the cubes to help you.
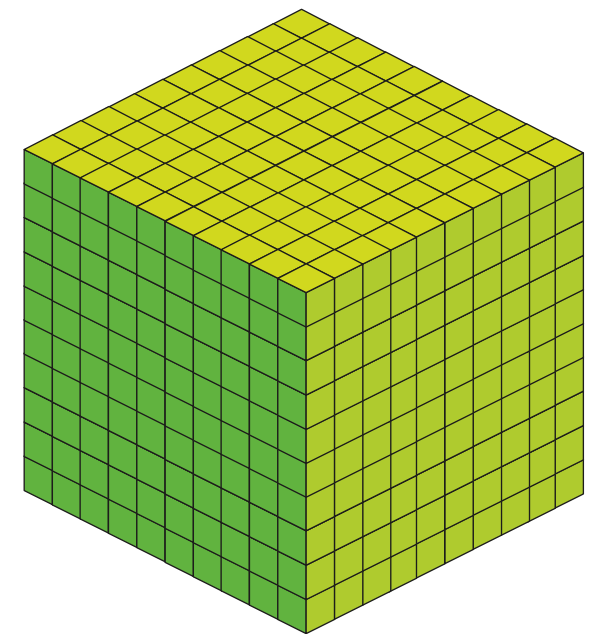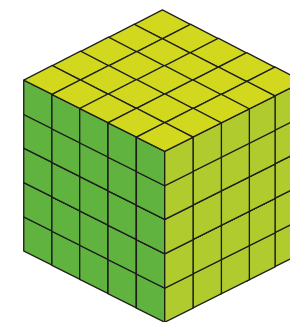
a) 5^3 = 125

5 cubed = 125

5 × 5 × 5 = 125

b) 10^3 = 1,000

10 cubed = 1,000

10 × 10 × 10 = 1,000

5 **a)** Which calculation is the same as 6^3?

Tick your answer.

6×3	$6 + 6 + 6$	$6 \times 6 \times 6$
☐	☐	✓

b) Kim has worked out 6^3 using this method.

$6^3 = (6 \times 6) \times 6$

$\quad = 36 \times 6$

$\quad = 216$

	30	6
6	30 × 6 = 180	6 × 6 = 36
	180 + 36 = 216	

Is Kim's method correct? _Yes_

How do you know?

She has correctly calculated 6×6 then multiplied

her answer by 6

c) Match the cube numbers to the calculations.

One has been done for you.

4^3 — 4 × 2

5^3 — 9 × 3

2^3 — 16 × 4

3^3 — 25 × 5

6 Calculate 7^3

343

7

> 1^3 is 1, and
> 3^3 is 9
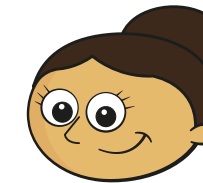
What mistake has Dora made?

Why might she have made this mistake?

She has calculated 3x3 because the power is

3 rather than 3x3x3

8 Scott's age is a cube number.

His sister is 2 years younger than him.

Her age is a square number.

In 3 years, Scott's age will be a multiple of 10

How old is Scott?

Scott is [27] years old.

Multiply by 10, 100 and 1,000

1 Complete the multiplications.

a)

Th	H	T	O
			7

$7 \times 10 =$ | 70 |

b)

Th	H	T	O
		3	9

$39 \times 10 =$ | 390 |

c)

Th	H	T	O
	2	0	5

$205 \times 10 =$ | 2,050 |

d) What happens to the digits when you multiply by 10?

They move one place to the left.

2 Complete the multiplication sentences.

a) $9 \times 10 =$ 90

b) $54 \times 10 =$ 540

c) $10 \times 13 =$ 130

d) $126 \times 10 =$ 1,260

e) 32 $\times 10 = 320$

f) $10 \times$ 135 $= 1,350$

g) $20 \times 10 =$ 200

h) 500 $\times 10 = 5,000$

3 Multiply each number by 100 and then by 1,000

a)

HTh	TTh	Th	H	T	O
					9

$9 \times 100 =$ 900

$9 \times 1,000 =$ 9,000

b)

HTh	TTh	Th	H	T	O
				1	6

$16 \times 100 =$ 1,600

$16 \times 1,000 =$ 16,000

c)

HTh	TTh	Th	H	T	O
			2	4	5

$245 \times 100 =$ 24,500

$245 \times 1,000 =$ 245,000

d) Explain to a partner how you multiply a number by 100

Ask them to explain how to multiply by 1,000

4 Complete the multiplication sentences.

a) $45 \times 100 =$ 4,500

$52 \times 100 =$ 5,200

$70 \times 100 =$ 7,000

b) $612 \times 100 =$ 61,200

$715 \times 100 =$ 71,500

$720 \times 100 =$ 72,000

c) $41 \times 10 =$ 410

$41 \times 100 =$ 4,100

$41 \times 1,000 =$ 41,000

d) $10 \times 952 =$ 9,520

$100 \times 952 =$ 95,200

$1,000 \times 952 =$ 952,000

5 Write >, < or = to make the statements true.

a) 78 × 10 $\boxed{<}$ 78 × 100

b) 100 × 56 $\boxed{<}$ 65 × 100

c) 930 × 10 $\boxed{=}$ 100 × 93

d) 1,000 × 482 $\boxed{>}$ 482 × 100

6

54 × 1,000
is the same as
54 × 10 × 10 × 10
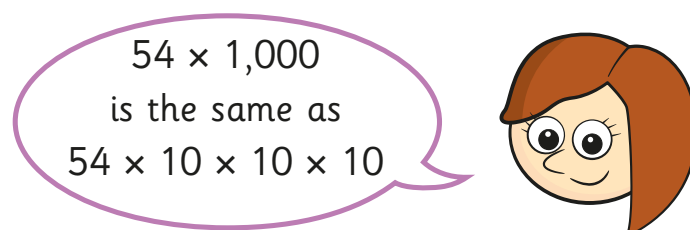
Is Rosie correct? _Yes_

Explain how you know.

___10 × 10 × 10 = 1,000___

_____

7 Complete the multiplication sentences.

a) 52 × $\boxed{100}$ = 5,200

b) 95 × $\boxed{10}$ = 950

c) 136 × $\boxed{10}$ = 1,360

d) 272 × $\boxed{1,000}$ = 272,000

e) 6,200 = $\boxed{100}$ × 62

f) $\boxed{10}$ × 370 = 3,700

g) $\boxed{82}$ × 100 = 8,200

h) $\boxed{820}$ × 100 = 82,000

i) $\boxed{3,900}$ × 10 = 39,000

j) 1,000 × $\boxed{80}$ = 80,000

8 Ron and Dani have paper rounds.

Ron delivers 75 papers a month.

Dani delivers 10 times as many papers a month as Ron.

How many papers do they deliver altogether?

$\boxed{825}$ papers

9 Mrs Hall owns a bookshop.

- In January, she sold 145 books.
- In February she sold 10 times as many books.
- In March she sold 10 times as many books as in February.

How many books did Mrs Hall sell in March?

Show your workings.

$\boxed{14,500}$

Compare answers with a partner.

10 Amir thinks of a number.

He multiplies it by 100

The answer has the same digit in the thousands and hundreds columns.

The total of all the digits is 8

What could the number be?

E.g. $\boxed{44}$

Divide by 10, 100 and 1,000

1 Complete the division sentences.

a)

Th	H	T	O
		6	0

$60 \div 10 = \boxed{6}$

b)

Th	H	T	O
	4	9	0

$490 \div 10 = \boxed{49}$

c)

Th	H	T	O
1	4	9	0

$1,490 \div 10 = \boxed{149}$

d) What happens to the digits when you divide a number by 10?

They move one place to the right.

2 Complete the division sentences.

a) $90 \div 10 = \boxed{9}$

b) $750 \div 10 = \boxed{75}$

c) $820 \div 10 = \boxed{82}$

d) $\boxed{146} = 1,460 \div 10$

e) $32,390 \div 10 = \boxed{3,239}$

f) $6,200 \div 10 = \boxed{620}$

g) $700 \div 10 = \boxed{70}$

h) $92,000 \div 10 = \boxed{9,200}$

3 Complete the divisions.

a)

HTh	TTh	Th	H	T	O
			9	0	0

$900 \div 100 = \boxed{9}$

b)

HTh	TTh	Th	H	T	O
	1	6	0	0	0

$16,000 \div 100 = \boxed{160}$

c)

HTh	TTh	Th	H	T	O
		9	0	0	0

$9,000 \div 1,000 = \boxed{9}$

d)

HTh	TTh	Th	H	T	O
7	6	8	0	0	0

$768,000 \div 1,000 = \boxed{768}$

4 Explain to a partner how to divide a number by 100

Ask them to explain to you how to divide a number by 1,000

5 Complete the division sentences.

a) $4,500 \div 10 = \boxed{450}$

$62,000 \div 10 = \boxed{6,200}$

$739,300 \div 10 = \boxed{73,930}$

b) $4,500 \div 100 = \boxed{45}$

$62,000 \div 100 = \boxed{620}$

$739,300 \div 100 = \boxed{7,393}$

c) $\boxed{760} \div 10 = 76$

$\boxed{7,600} \div 100 = 76$

$\boxed{76,000} \div 1,000 = 76$

d) $\boxed{30,000} \div 1,000 = 30$

$\boxed{300,000} \div 1,000 = 300$

$\boxed{3,000,000} \div 1,000 = 3,000$

6 Complete the table.

Number	Number divided by 10	Number divided by 100	Number divided by 1,000
65,000	6,500	650	65
72,000	7,200	720	72
350,000	35,000	3,500	350

7 Write >, < or = to make the statements true.

a) 4,900 ÷ 10 ⟨ > ⟩ 4,900 ÷ 100

b) 56,000 ÷ 100 ⟨ < ⟩ 65,000 ÷ 100

c) 93,000 ÷ 1,000 ⟨ = ⟩ 9,300 ÷ 100

d) 5,700 ÷ 100 ⟨ > ⟩ 5,700 ÷ 1,000

8 Complete the sentences.

a) Dividing a number by 10 and then by 10 again is the same as

dividing by 100 _____

b) Dividing a number by 1,000 is the same as dividing by 10

and then by 100 _____

Compare answers with a partner.

9 In 2019, 568,000 houses were built.

In 2018, 10 times fewer houses were built.

In 2017, 100 times fewer houses were built.

a) How many houses were built in 2018?

56,800 houses

b) How many houses were built in 2017?

5,680 houses

c) How many houses were built between 2017 and 2019?

630,480 houses

10 Alex is thinking of a number.

She divides it by 100

The answer has one more in the hundreds column than in the tens column.

The total of the digits is 15
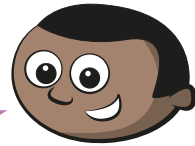
What could the number be?

E.g. 87,000

How many different answers can you find?

Multiples of 10, 100 and 1,000

1 Mo is multiplying numbers by 20

> To multiply by 20, I multiply first by 2 and then by 10

a) Use Mo's method to complete the multiplication sentences.

$7 \times 20 =$ 140

$12 \times 20 =$ 240

$20 \times 134 =$ 2680

b) Would you get the same answer if you multiplied by 10 first and then by 2? ___Yes___

Write an example.

$7 \times 2 \times 10 = 14 \times 10 = 140$

$7 \times 10 \times 2 = 70 \times 2 = 140$

2 Complete the sentences.

a) To multiply by 50, you multiply by 5 first and then by [10]

b) To multiply by 200, you multiply by [2] first and then by [100]

c) To multiply by 7,000 you multiply by [7] first and then by [1,000]

3 Complete the multiplication sentences. Show all the steps in your thinking.

a) $7 \times 500 =$ 3,500

b) $6,000 \times 8 =$ 48,000

c) $300 \times 90 =$ 27,000

d) $500 \times 300 =$ 150,000

4 Complete the calculations.

a) $300 \times$ [30] $= 9,000$ **d)** [300] $\times 90 = 27,000$

b) $6,000 \times$ [3] $= 18,000$ **e)** $500 \times 60 =$ [30,000]

c) $700 \times$ [40] $= 28,000$ **f)** $8,000 \times$ [90] $= 720,000$

5

$$42 \times 3 = 126$$

Use this fact to solve the calculations.

a) $42 \times 30 =$ 1,260   **c)** $300 \times 42 =$ 12,600

b) $420 \times 3 =$ 1,260   **d)** $42 \times 3,000 =$ 126,000

6 Here are two methods to solve 16 × 50

Method 1	**Method 2**
16 × 10 × 5	16 × 5 × 10
= 160 × 5	= 80 × 10
= 800	= 800

a) What is the same about the methods?

What is different?

b) What other method could you use to multiply by 50?

Show your method.

e.g. 16 × 100 ÷ 2 = 1,600 ÷ 2 = 800

c) Share your method with a partner.

7 Jack and Mo are calculating 3,500 ÷ 70

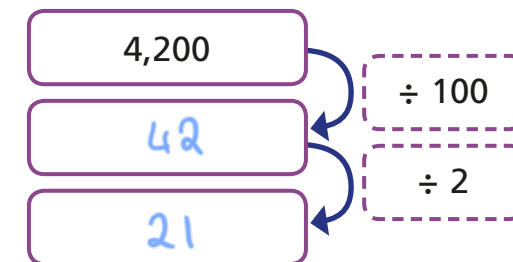| **Jack's workings**	**Mo's workings**
3,500 ÷ 10 = 350	3,500 ÷ 10 = 350
350 × 7 = 2,450	350 ÷ 7 = 50

a) Whose workings are correct? __Mo__

b) What mistake has the other person made?

8 Complete the division diagrams.

a) 4,200 ÷ 200

| 4,200 |
| 42 | ÷ 100
| 21 | ÷ 2

b) 36,000 ÷ 6,000

| 36,000 |
| 36 | ÷ 1,000
| 6 | ÷ 6
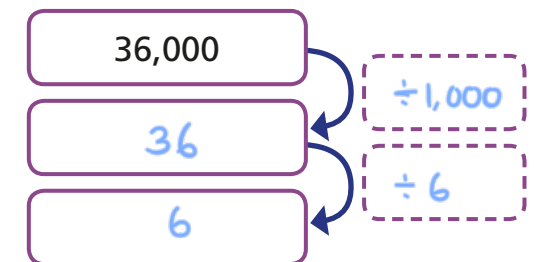
Complete the division sentences.

c) 3,200 ÷ 80 = 40

3,200 ÷ 800 = 4

d) 72,000 ÷ 9,000 = 8

72,000 ÷ 900 = 80

72,000 ÷ 90 = 800

9 Match the calculations to the answers.

One has been done for you.

8 × 40	→	3,200
3,200 ÷ 80		320
4 × 800		40
32,000 ÷ 40		800

10 The answer is 400

What could the question be?

Write 4 division and 4 multiplication questions.

Ask a partner to check your questions.