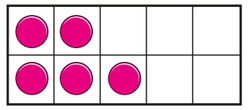
Multiples

1 What numbers are represented?



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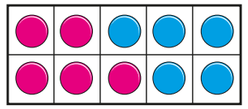

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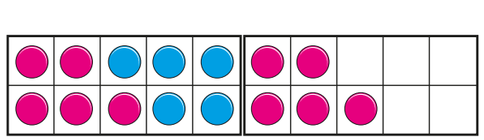

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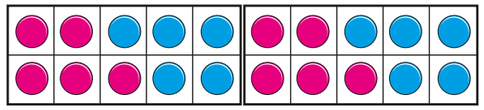


20

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

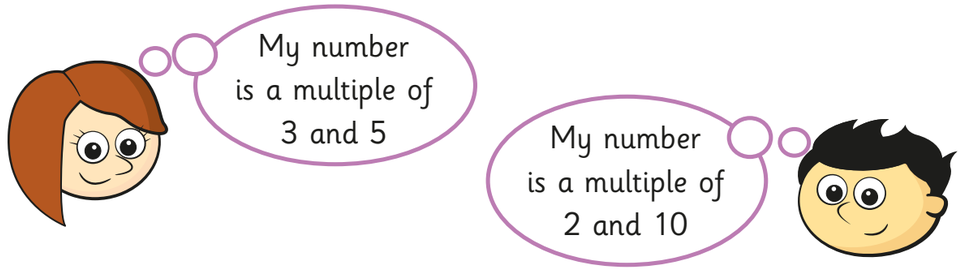
a) Colour the multiples of 3

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.



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

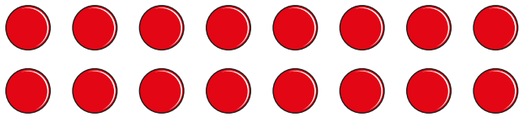
255 270 285 300 315 330 345

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

Factors

1 Alex arranges 16 counters in different ways.

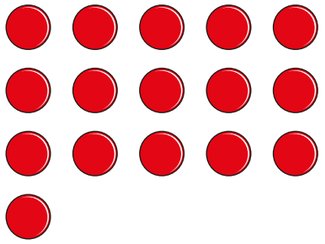
She is trying to work out some factors.



a) Use the array to complete the sentence.

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.

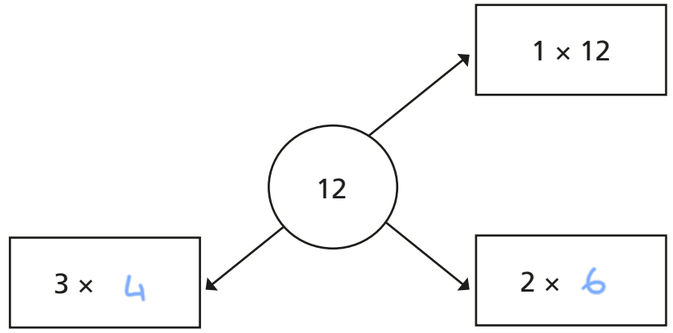
2 Use 20 counters.

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

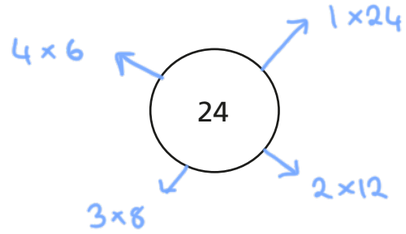
3 **a)** Complete the diagram to show the pairs of numbers that multiply to make 12



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



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

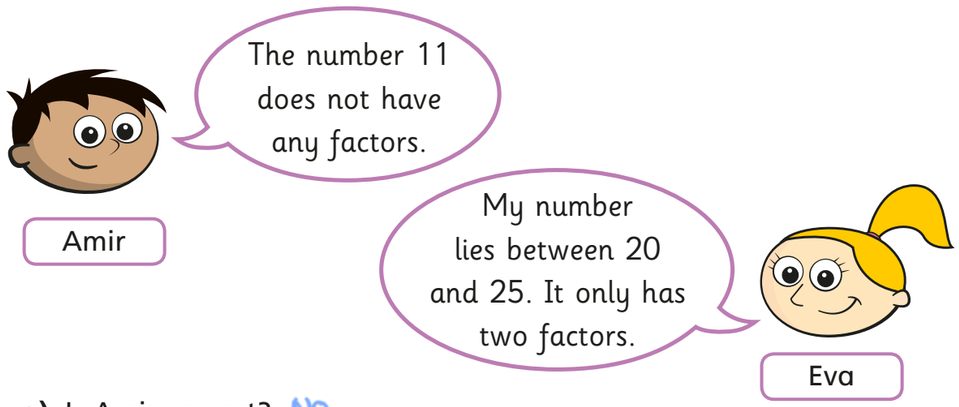
5 **15** **25** **3** **30** **4** **2** **12** **60** **0**

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.



a) Is Amir correct? No

Explain your answer.

1×11=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÷20=9 190 is 10 more than 180 so 20 can't be a factor.

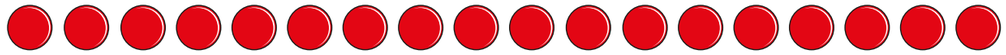
10 Is this statement always, sometimes or never true?

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

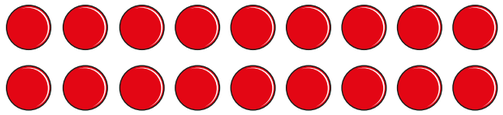
Common factors

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

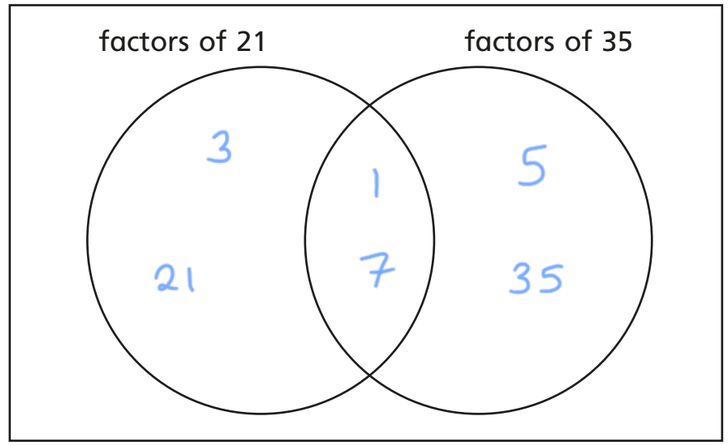
b) The factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30

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



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?

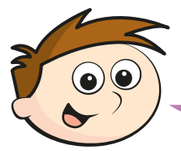
2, 3, 5, 6, 10

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?

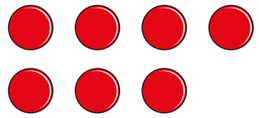
72	and	80

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?

1 and 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 × 5 = 25

5 Here are sequences of consecutive prime numbers.

Complete the sequences.

a) 7, 11, 13, 17, 19

b) 37, 31, 29, 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

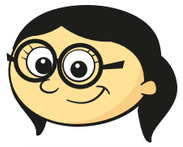
7 Here are some numbers.

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

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

Jack

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



Annie

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

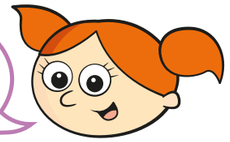
Compare answers with a partner.

8 Mo and Alex are talking about prime numbers.

Prime numbers are always odd.

Mo

I think prime numbers can be even.



Alex

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

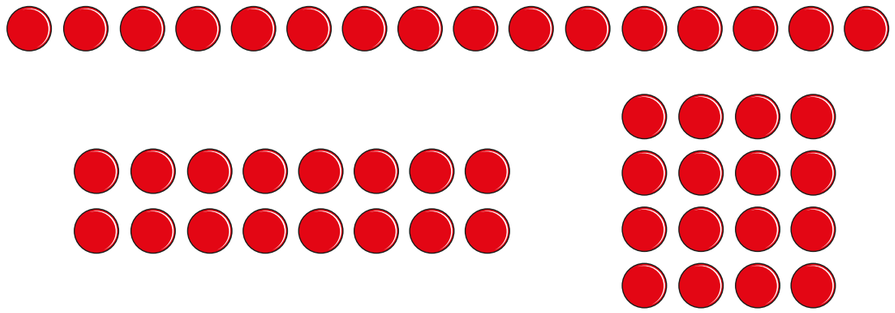
10 Kim is thinking of a prime number.

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

What number is Kim thinking of?

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?

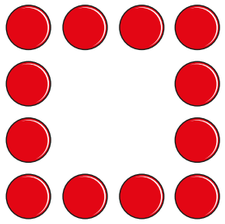
You can make a square array using 9 counters.

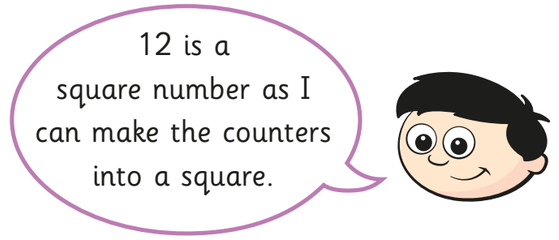
3 Which of these numbers are square numbers?

Circle your answers.

4 **10** **18** **25**

4 Dexter makes a square using 12 counters.





What mistake has Dexter made?

His square is incomplete.

5 Whitney is working out a calculation.

$8 \times 8 = 16$

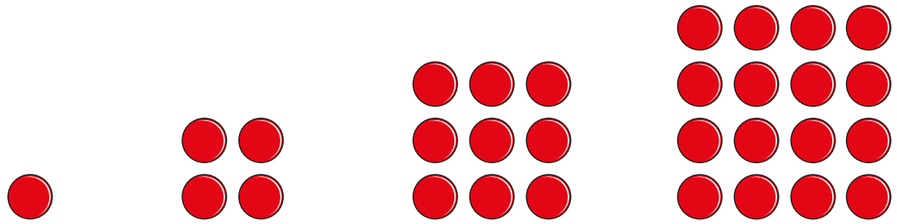
What mistake has Whitney made?

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.

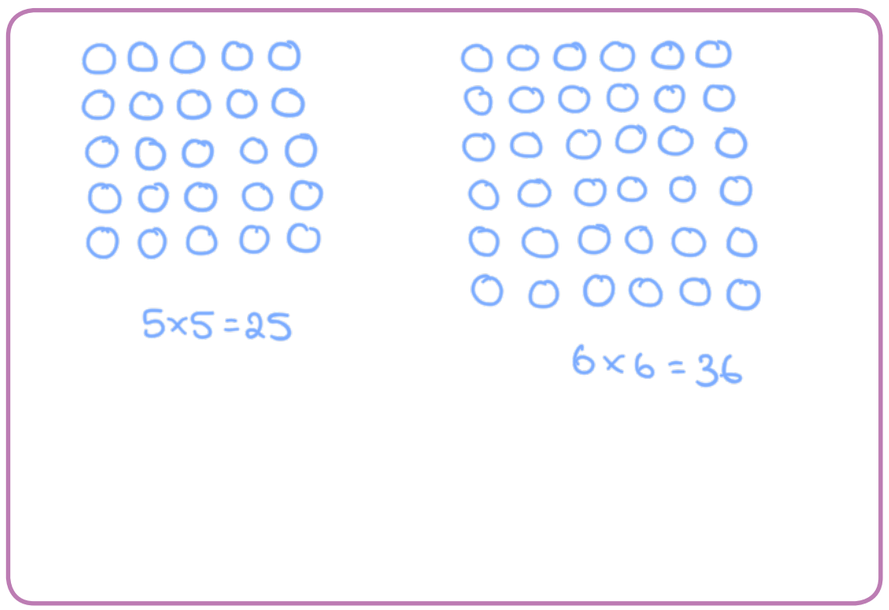


$1 \times 1 =$ 1 $\quad 2 \times 2 =$ 4 $\quad 3 \times$ 3 $=$ 9 $\quad$ 4 $\times$ 4 $=$ 16

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.



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

49, 64, 81, 100

7 Complete the statements.

a) $6^2 =$ 36

b) $12^2 =$ 144

c) 81 $= 9^2$

d) $0^2 =$ 0

e) 10 $^2 = 100$

f) $64 =$ 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?

36

10 Huan is celebrating his birthday.

His age is a square number.

Last year he was a multiple of 12

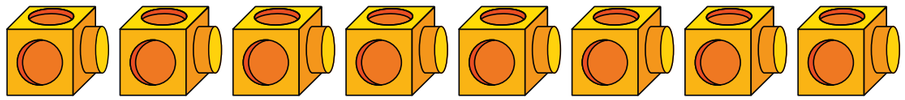
Next year he will be a multiple of 10

How old is Huan?

49

Cube numbers

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

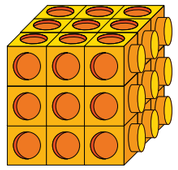


b) Is it possible to fit 9 multilink cubes together to make a larger cube? No

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.

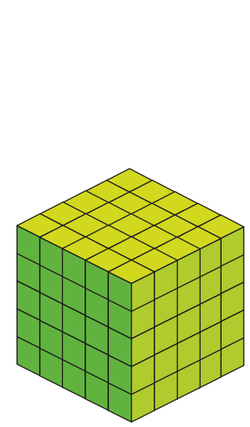
2^3	2 × 2 × 2	8
3^3	3 × 3 × 3	27
4^3	4 × 4 × 4	64

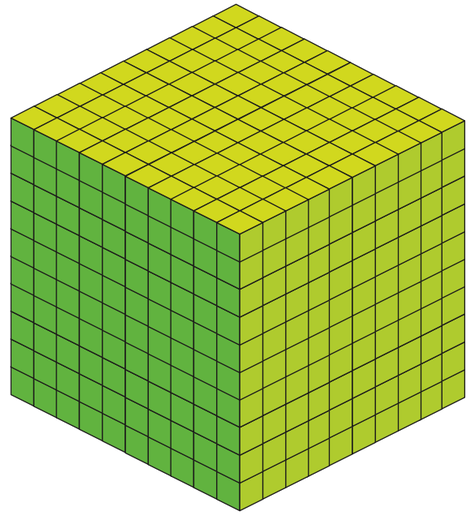
b) What would the next cube number in the table be?

$5^3 = 5 \times 5 \times 5 = 125$

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.

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

$= 36 \times 6$

$= 216$

	30	6
6	$30 \times 6 = 180$	$6 \times 6 = 36$

$180 + 36 = 216$

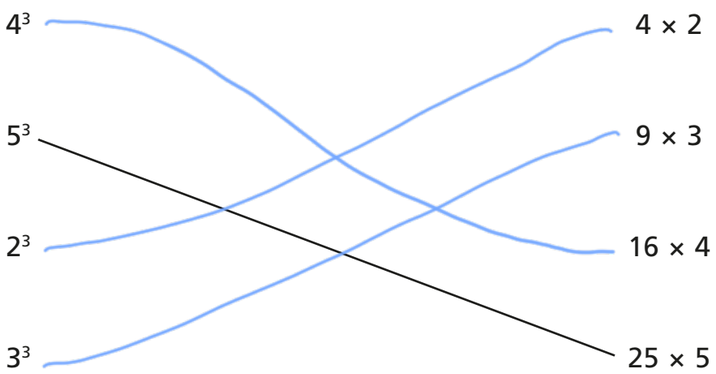
Is Kim's method correct? Yes

How do you know?

She has correctly calculated 6×6 then multiplied her answer by 6

c) Match the cube numbers to the calculations.

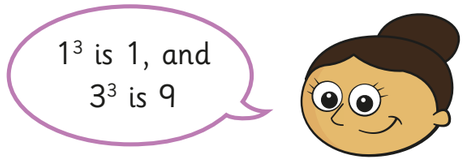
One has been done for you.



6 Calculate 7^3

343

7



What mistake has Dora made?

Why might she have made this mistake?

She has calculated 3×3 because the power is 3 rather than 3×3×3

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 × 10 = 70

b)

Th	H	T	O
		3	9

39 × 10 = 390

c)

Th	H	T	O
	2	0	5

205 × 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 × 10 = 90

b) 54 × 10 = 540

c) 10 × 13 = 130

d) 126 × 10 = 1,260

e) 32 × 10 = 320

f) 10 × 135 = 1,350

g) 20 × 10 = 200

h) 500 × 10 = 5,000

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

a)

HTh	TTh	Th	H	T	O
					9

9 × 100 = 900

9 × 1,000 = 9,000

b)

HTh	TTh	Th	H	T	O
				1	6

16 × 100 = 1,600

16 × 1,000 = 16,000

c)

HTh	TTh	Th	H	T	O
			2	4	5

245 × 100 = 24,500

245 × 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 × 100 = 4,500

52 × 100 = 5,200

70 × 100 = 7,000

b) 612 × 100 = 61,200

715 × 100 = 71,500

720 × 100 = 72,000

c) 41 × 10 = 410

41 × 100 = 4,100

41 × 1,000 = 41,000

d) 10 × 952 = 9,520

100 × 952 = 95,200

1,000 × 952 = 952,000

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

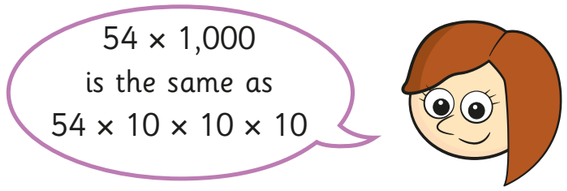
a) 78 × 10 < 78 × 100

b) 100 × 56 < 65 × 100

c) 930 × 10 = 100 × 93

d) 1,000 × 482 > 482 × 100

6



Is Rosie correct? Yes

Explain how you know.

10 × 10 × 10 = 1,000

7 Complete the multiplication sentences.

a) 52 × 100 = 5,200

b) 95 × 10 = 950

c) 136 × 10 = 1,360

d) 272 × 1,000 = 272,000

e) 6,200 = 100 × 62

f) 10 × 370 = 3,700

g) 82 × 100 = 8,200

h) 820 × 100 = 82,000

i) 3,900 × 10 = 39,000

j) 1,000 × 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?

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.

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. 44

Divide by 10, 100 and 1,000

1 Complete the division sentences.

a)

Th	H	T	O
		6	0

60 ÷ 10 = 6

b)

Th	H	T	O
	4	9	0

490 ÷ 10 = 49

c)

Th	H	T	O
1	4	9	0

1,490 ÷ 10 = 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 ÷ 10 = 9

b) 750 ÷ 10 = 75

c) 820 ÷ 10 = 82

d) 146 = 1,460 ÷ 10

e) 32,390 ÷ 10 = 3,239

f) 6,200 ÷ 10 = 620

g) 700 ÷ 10 = 70

h) 92,000 ÷ 10 = 9,200

3 Complete the divisions.

a)

HTh	TTh	Th	H	T	O
			9	0	0

900 ÷ 100 = 9

b)

HTh	TTh	Th	H	T	O
	1	6	0	0	0

16,000 ÷ 100 = 160

c)

HTh	TTh	Th	H	T	O
		9	0	0	0

9,000 ÷ 1,000 = 9

d)

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

768,000 ÷ 1,000 = 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 ÷ 10 = 450

62,000 ÷ 10 = 6,200

739,300 ÷ 10 = 73,930

b) 4,500 ÷ 100 = 45

62,000 ÷ 100 = 620

739,300 ÷ 100 = 7,393

c) 760 ÷ 10 = 76

7,600 ÷ 100 = 76

76,000 ÷ 1,000 = 76

d) 30,000 ÷ 1,000 = 30

300,000 ÷ 1,000 = 300

3,000,000 ÷ 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

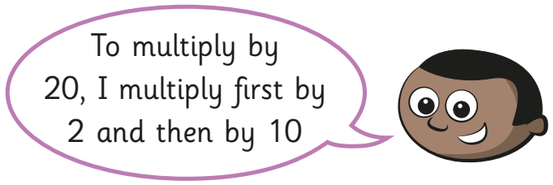
What could the number be?

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



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

7 × 20 = 140

12 × 20 = 240

20 × 134 = 2680

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

Write an example.

7 × 2 × 10 = 14 × 10 = 140

7 × 10 × 2 = 70 × 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 × 500 = 3,500

b) 6,000 × 8 = 48,000

c) 300 × 90 = 27,000

d) 500 × 300 = 150,000

4 Complete the calculations.

a) 300 × 30 = 9,000

b) 6,000 × 3 = 18,000

c) 700 × 40 = 28,000

d) 300 × 90 = 27,000

e) 500 × 60 = 30,000

f) 8,000 × 90 = 720,000

5

42 × 3 = 126

Use this fact to solve the calculations.

a) 42 × 30 = 1,260

b) 420 × 3 = 1,260

c) 300 × 42 = 12,600

d) 42 × 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

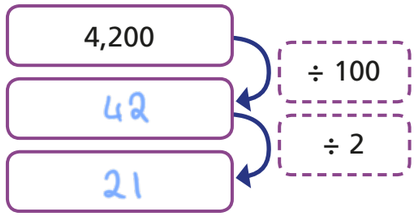
Jack's workings	Mo's workings
3,500 ÷ 10 = 350	3,500 ÷ 10 = 350
350 × 7 = 2,450	350 ÷ 7 = 50

a) Whose workings are correct? Mo

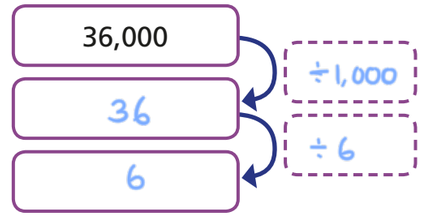
b) What mistake has the other person made?

8 Complete the division diagrams.

a) 4,200 ÷ 200



b) 36,000 ÷ 6,000



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.