

Oxford **Mathematics**

Primary Years Programme



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OXFORD

Oxford Mathematics

Primary Years Programme

6

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NUMBER, PATTERN AND FUNCTION

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UNIT 1: TOPIC 1

Place value

Working with very large numbers

Large numbers have a gap between each set of three digits.

837452691 is easier to read if we write 837 452 691. It also makes it easier to say the number:

eight hundred and thirty-seven million, four hundred and fifty-two thousand, six hundred and ninety-one

Guided practice

1 Look at this number: 5 367 918

Show the value of each digit on the place-value grid.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Write the number using gaps if necessary
5	0	0	0	0	0	0	5 000 000

2 If we write nine hundred and five thousand, four hundred and seventy-six in digits, we use a zero to show there are no tens of thousands:

905 476

Write as digits:

a fifty-one thousand, six hundred and four

b two hundred thousand and twenty-six

c twelve thousand and ten

Remember to use a zero as a space-filler.



Independent practice

1 What is the value of the red digit?

a 4**6**3 290 _____

b 6 **3**29 477 _____

c 2 40**6** 219 _____

d **5**1 385 067 _____

e **8**0 487 003 _____

f **3**51 000 819 _____

2 Write the numbers from question 1 in words.

a _____

b _____

c _____

d _____

e _____

f _____

3 Write these numbers as digits.

a eighty million, four hundred and eighty-seven thousand

b ten million, three hundred and sixty-two thousand and fifty-nine

c one hundred and fourteen million, seven hundred and sixty thousand, two hundred and nine

d one billion, four hundred million, five hundred and ninety-three thousand and one

- 4 Expand these numbers. The first one has been done for you.

Remember to use spaces between the digits where necessary.



- a 374 596: $300\ 000 + 70\ 000 + 4000 + 500 + 90 + 6$
- b 214 867: $200\ 000 +$ _____
- c 2 567 321: _____
- d 5 673 207: _____
- e 57 319 240: _____
- f 407 508 004: _____

- 5 Look at these digit cards.



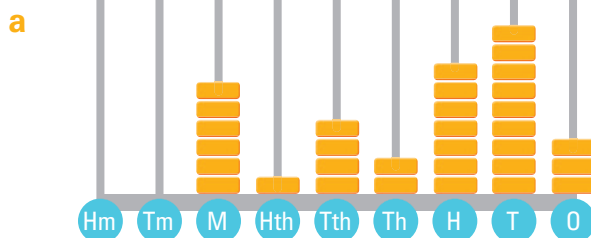
- a What is the **largest** number that can be made using all the cards?

- b What is the **smallest** number that can be made if the digit "5" is in the millions place?

- c What is the **largest** number that can be made if the "7" is seven ones?

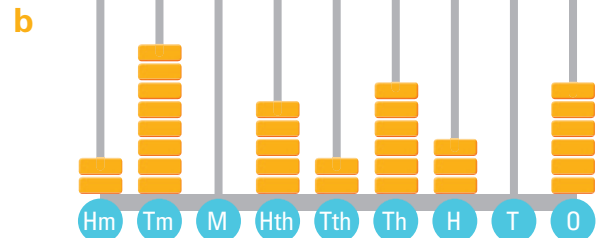
- d What is the **smallest** number that can be made if the "1" is in the tens of thousands place?

- 6 Write the number shown on each spike abacus as digits and in words.



digits: _____

words: _____



digits: _____

words: _____

Extended practice

1 To change the calculator screen to show the second number, I would press:

a $24\ 550$ _____ = $24\ 650$

b $37\ 154$ _____ = $77\ 154$

c $739\ 255$ _____ = $719\ 255$

d $999\ 999$ _____ = $1\ 000\ 000$

2 Sometimes large numbers are abbreviated. \$1K means \$1000. \$1.3M can be used for \$1 300 000. Write the new price of these houses using digits **in full**.

a \$345K reduced by \$5000 _____

b \$725K reduced by \$20 000 _____

c \$875K reduced by \$50K _____

d \$1.5M reduced by \$250K _____

3 Imagine you have to choose just **one** digit in each of these numbers. Write:

- the digit you would choose
- the value of the digit
- the reason for your choice.

a A share of \$574 612. _____

b Writing out your times tables 574 612 times. _____

c Eating 574 612 of your favourite snack food in 10 minutes. _____

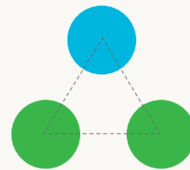
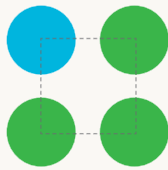
UNIT 1: TOPIC 2

Square numbers and triangular numbers

Numbers can be arranged in patterns



4 is a square number.



3 is a triangular number.



Guided practice

- 1 These are the first six square numbers. Fill in the gaps.

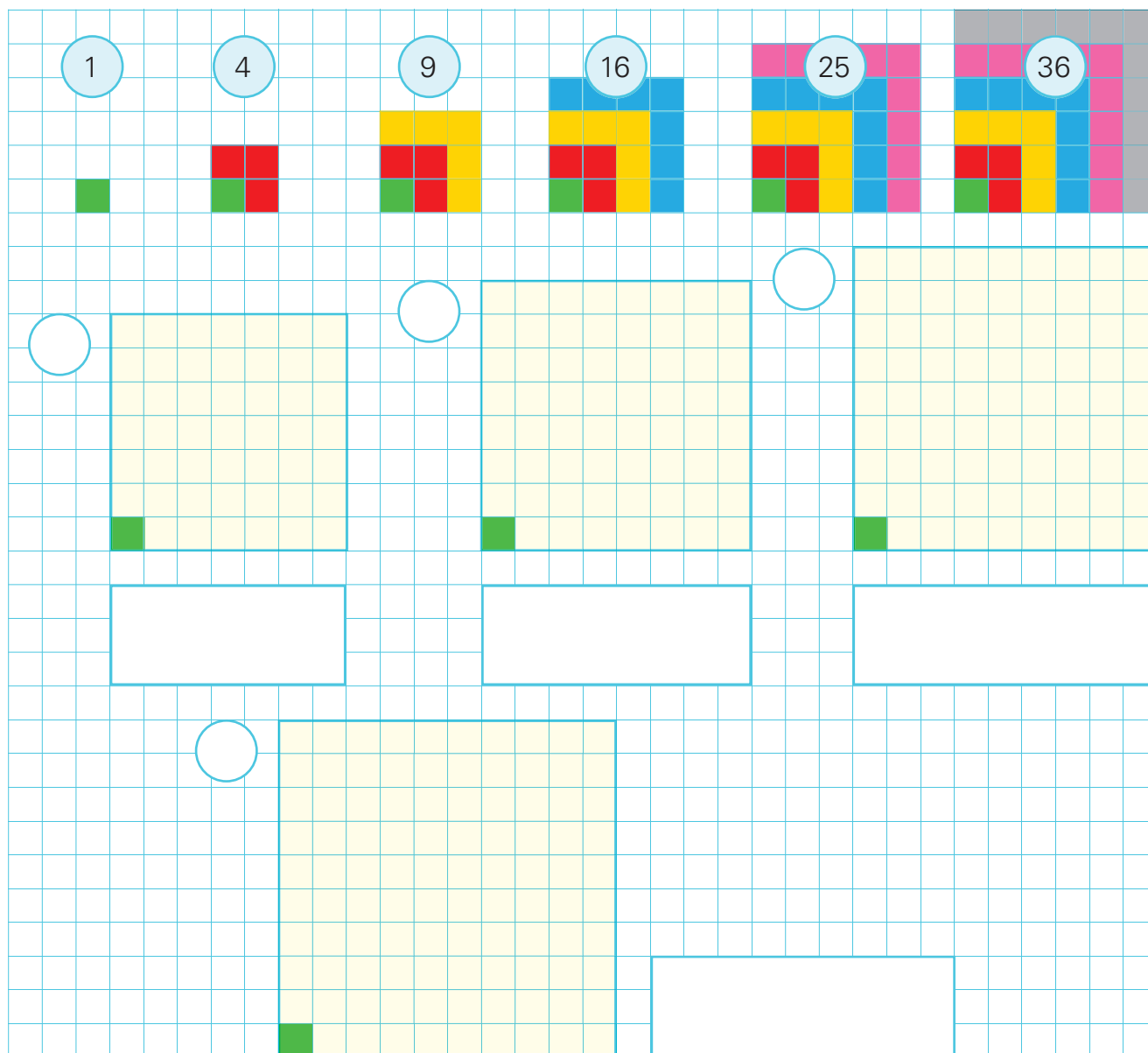
1	4	9	
$1 \times 1 = 1^2$ $1^2 = 1$	$2 \times 2 = 2^2$ $2^2 = 4$	$3 \times 3 = 3^2$ <div></div>	$4 \times 4 =$ <div></div> <div></div>
	<div></div> <div></div>		<div></div> <div></div>

- 2 These are the first four triangular numbers. Fill in the gaps.

1	3		
<div></div>	$1 + 2 = 3$	$1 + 2 + 3 =$ <div></div>	<div></div>

Independent practice

- 1 Complete the grid to show the first ten square numbers. Write the information as you did on page 10.



- 2 a What is the next number in the square number pattern?
- b How does the digit in the ones column change in the square number pattern?
- c Circle one answer. The 100th square number is:





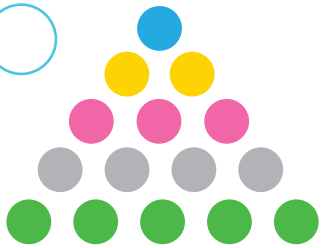
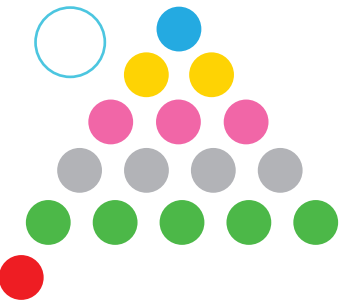
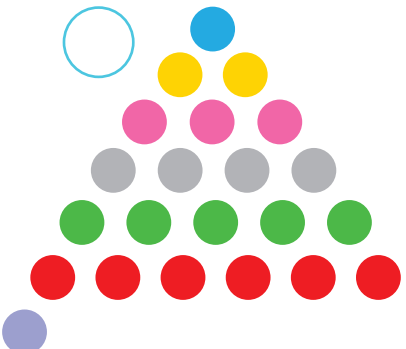
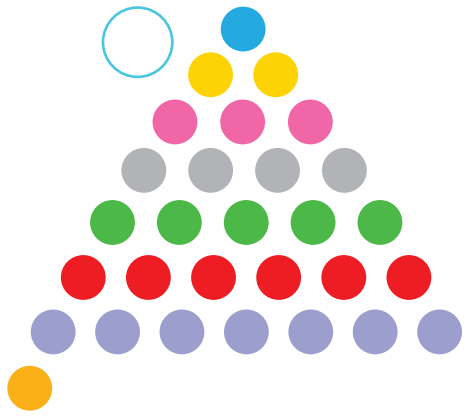
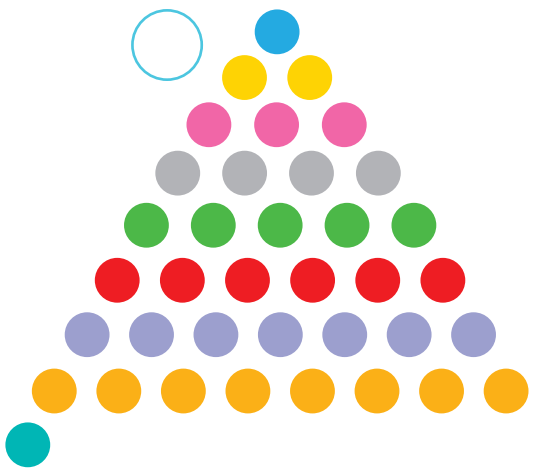
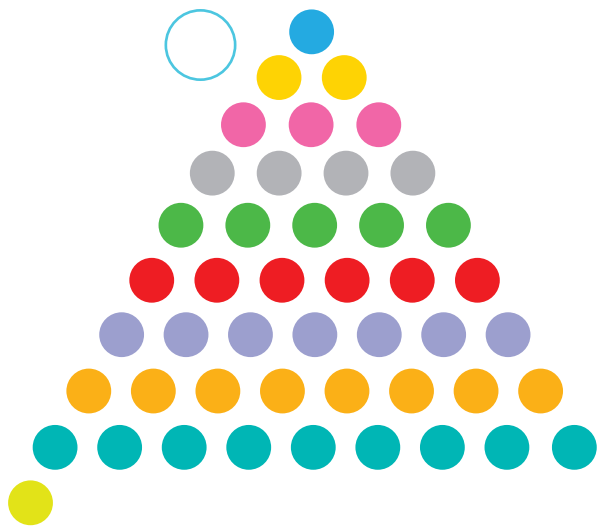
100

1000

10 000

100 000

3 Complete the pattern and information to show the first 10 triangular numbers.

1	3	6	10	
				
1	$1 + 2 = 3$	$1 + 2 + 3 = 6$	$1 + 2 + 3 + 4 = 10$	$1 + 2 + $ <input type="text"/>
				
<input type="text"/>	<input type="text"/>	<input type="text"/>		
				
<input type="text"/>	<input type="text"/>			

4 a What is the 11th triangular number?

b Apart from 1, which triangular number is also a square number?

c How does the triangular number pattern grow? (Hint: Think about odd and even numbers.) _____

Extended practice

1 Continue this table.

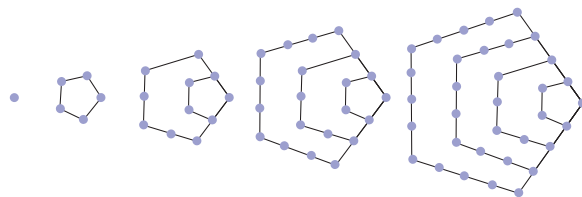
Square number	Multiplication fact	Addition fact
$1^2 = 1$	$1 \times 1 = 1$	1
$2^2 = 4$	$2 \times 2 = 4$	$1 + 3 = 4$
$3^2 = 9$	$3 \times 3 = 9$	$1 + 3 + 5 = 9$
$4^2 =$		
$5^2 =$		
$6^2 =$		
$7^2 =$		
$8^2 =$		
$9^2 =$		
$10^2 =$		

2 a What do you notice about the way the addition facts grow in question 1?

b Write the facts for the 11th square number. _____

c How many would you add to the 11th square number to find the 12th square number? _____

3 This pattern shows the first few pentagonal numbers.



a One of the numbers in this list is **not** a pentagonal number. Which number is it?

5, 12, 15, 22, 35

b Write the first 5 pentagonal numbers. _____

c Write an explanation that would help a younger student to understand the connection between each pentagonal number and the one that follows it.

d On a separate piece of paper, draw a diagram of the 6th pentagonal number.

UNIT 1: TOPIC 3

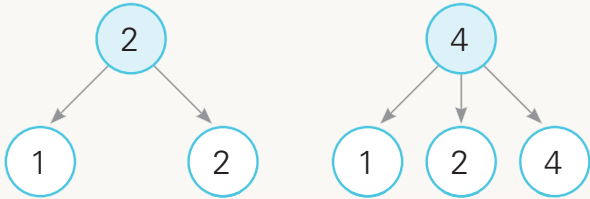
Prime and composite numbers

How do we recognise a prime number?

We say a number is *prime* if it has just two factors: 1 and itself. The number 2 is the smallest prime number because it can only be divided by 1 and 2. Numbers that have more than two factors are called *composite* numbers.

A prime number has just 2 factors.

A composite number has more than 2 factors.



Guided practice

1 Complete this chart.

1 only has one factor, so it is neither a prime number nor a composite number.



Number	Factors (numbers it can be divided by)	How many factors?	Prime or composite?	
			Prime	Composite
1	1	1	neither	
2	1 and 2	2	✓	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

- 2 a List the prime numbers between 2 and 20. _____
- b Comment on the number of even prime numbers. _____

Independent practice

- 1 Follow these instructions to complete the grid. The grid has been started for you.

1	2	3	4	5	6	7	8	9	10
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
41	42	43	44	45	46	47	48	49	50
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
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- a 1 is neither prime nor composite. Draw a star around it.
- b 2 is a prime number. Circle it.
- c Lightly shade all the multiples of 2. They are composite numbers.
- d Put a circle around the next prime number: 3
- e Lightly shade all the multiples of 3. They are composite numbers.
- f Put a circle around the next prime number: 5
- g Lightly shade all the multiples of 5. They are composite numbers.
- h Find the **next** prime number. Circle it.
- i Lightly shade all its multiples.
- j Repeat Step h and Step i until you get to the end of the grid.

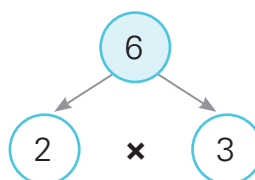
- 2 a The highest prime number on the grid is:

- b True or false? All the prime numbers are odd. _____

- c True or false? More of the composite numbers are even than odd. _____

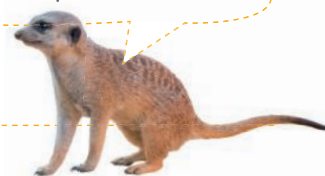
3

All composite numbers are made by multiplying prime numbers. 6 is a composite number. It can be made by multiplying 2 prime numbers: 2×3 . We can show it in a factor tree:

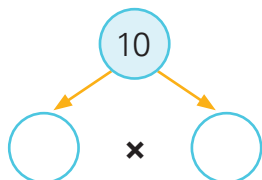


The prime factors of 6 are 2 and 3.
So $6 = 2 \times 3$

Prime factors are two or more prime numbers that are multiplied together to make a composite number.

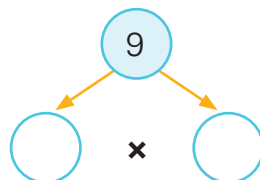


Fill in the gaps:



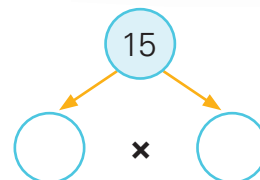
a The prime factors of 10 are

_____.



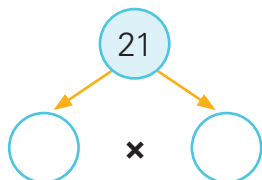
b The prime factors of 9 are

_____.



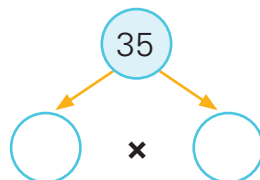
c The prime factors of 15 are

_____.



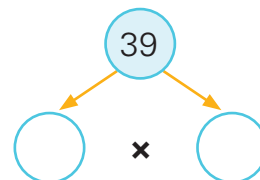
d The prime factors of 21 are

_____.



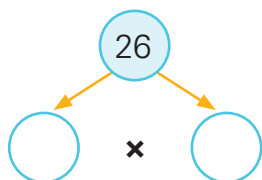
e The prime factors of 35 are

_____.



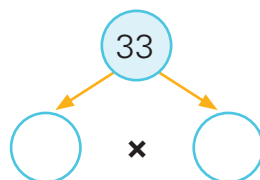
f The prime factors of 39 are

_____.



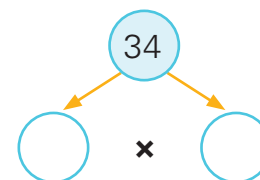
g The prime factors of 26 are

_____.



h The prime factors of 33 are

_____.



i The prime factors of 34 are

_____.

4

Draw factor trees for:

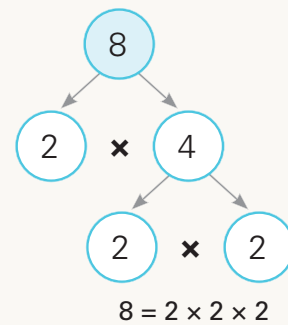
a 14

b 55

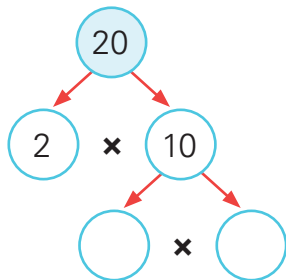
c 49

Extended practice

The prime factors of 8 are 2, 2 and 2. To show the prime factors of 8, we can write $2 \times 2 \times 2$. We can also write 2^3 .

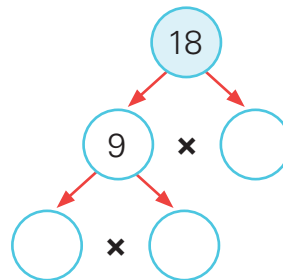


1 Fill in the gaps.



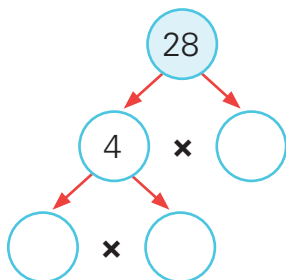
a $20 = 2 \times 2 \times \underline{\hspace{1cm}}$

$20 = 2 \square \times \underline{\hspace{1cm}}$



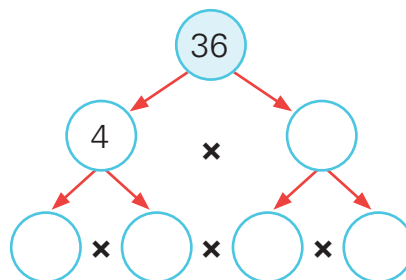
b $18 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

$18 = \underline{\hspace{1cm}} \square \times \underline{\hspace{1cm}}$



c $28 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

$28 = \underline{\hspace{1cm}} \square \times \underline{\hspace{1cm}}$



d $36 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

$36 = \underline{\hspace{1cm}} \square \times \underline{\hspace{1cm}} \square$

2 Draw factor trees to show the prime factors.

a 27

b 30

c 24