Student Book PYP

Oxford **Mathematics**

Primary Years Programme

5

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OXFORD

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Contents

NUMBER, PATTERN AND FUNCTION

MEASUREMENT, SHAPE AND SPACE

DATA HANDLING

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In a number, the value of each digit depends on its position, or place.

923856 is easier to read if we write it as 923 856.
It also makes it easier to say the number:
nine hundred and twenty-three thousand,
eight hundred and fifty-six.

Guided practice

1 Look at this number: 725 384. The 7 is worth 700 000.
Show the value of the other digits on the place value grid.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Write the number, using gaps if necessary
e.g.	7	0	0	0	0	0	700 000
a							
b							
c							
d							
e							

2 If we write thirty-two thousand, five hundred and nine in numerals, we use a zero to show there are no tens: **32 509**

Write as digits:

a nine thousand, three hundred and seven _____

b twenty-five thousand and forty-six _____

c one hundred and two thousand, seven hundred and one _____

3 Write in words:

a 2860 _____

b 13 465 _____

c 28 705 _____

Independent practice

1 What is the value of the red digit in each number?

e.g. **85 306:** **80 000**

a 5**3** 207: _____

b 4**8** 005: _____

c **2**9 425: _____

d **1**35 284: _____

e 399 **5**17: _____

2 Write each number from question 1 in words.

e.g. 85 306: eighty-five thousand, three hundred and six

a _____

b _____

c _____

d _____

e _____

3 Write these numbers as numerals.

a eighty-six thousand, two hundred and thirty-one _____

b one hundred and forty-two thousand _____

c six hundred and fifty-six thousand, three hundred and eight _____

d one hundred and five thousand, nine hundred and twenty-one _____

4 Circle the number that is **one more than** 25 789.

25 800 25 780 25 799 25 790

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

14 217: **10 000 + 4000 + 200 + 10 + 7**

Remember to use spaces between the digits where necessary.

a 25 123: 20 000 + _____

b 63 382: _____

c 6004: _____

d 125 381: _____

e 860 094: _____

6 Use the digits on the cards to make:

6	1	5	3	9	7

a the **largest** number using all the cards. _____

b the **smallest** number if "5" is in the ones place. _____

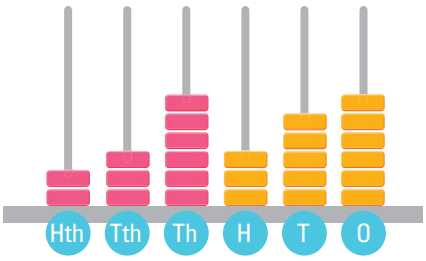
c the **largest** number if the "7" is in the hundreds of thousands place.

_____

d the **smallest** number if the "1" is in the thousands place. _____

7 Write the number shown on each spike abacus as numerals and in words.

a



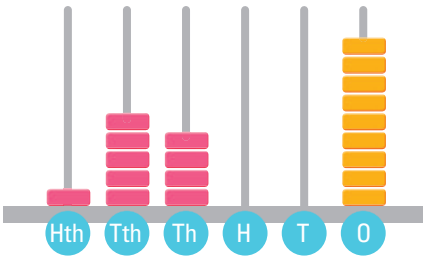
numeral: _____

words: _____

_____

_____

b



numeral: _____

words: _____

_____

_____

Extended practice

1 This table shows unusual record-breaking activities.

Place	Activity	Number
USA	Number of dogs on a dog walk together	
Spain	People salsa dancing together	
Poland	People ringing bells together	
Hong Kong	People playing percussion instruments together	
Singapore	People line dancing together	
Portugal	People making a human advertising sign	
Mexico	People doing aerobics at the same time	
India	Trees planted by a group in one day	
USA	People in a conga line	
England	The longest scarf ever knitted (in centimetres)	

Complete the number column in the table by rewriting the numbers below in order, from the **lowest** to the **highest** number. The events are in order from low to high.

Record numbers									
80 241	10 021	119 986	38 633	322 000	3117	34 309	3868	11 967	10 102

2 The following numbers are from the list in question 1. They have been rounded in various ways. Write the actual number for each.

a 80 000 _____

b 40 000 _____

c 3000 _____

d 300 000 _____

e 10 100 _____

f 10 000 _____

g 100 000 _____

h 12 000 _____

i 4000 _____

j 35 000 _____

3 Rounded to the nearest ten thousand, the 2006 population of Noosa in Queensland was 50 000 people. The actual number can be made by using each of these digits once: **1** **2** **5** **6** **9**

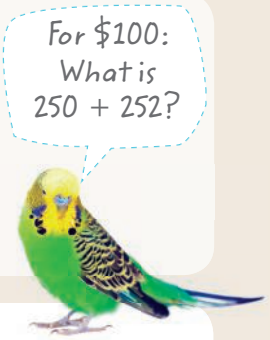
List as many of the 12 numbers that could be the actual population as you can.

_____

UNIT 1: TOPIC 2
Addition mental strategies

Finding a short cut

Imagine you were on a TV quiz show and had 4 seconds to answer the question. There are several strategies you could use to come up with the right answer. However, in only 4 seconds you would probably have to use a mental strategy.



Guided practice

1 You could use the **near-doubles** strategy for 252 + 250:
Double 250 is 500. Then add 2 = 502. Fill in the gaps.

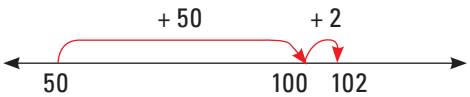
	Problem	Find a near-double	Now I need to:	Answer
e.g.	252 + 250	250 + 250 = 500	add 2 more	502
a	150 + 160	150 + 150 =	add 10 more	
b	126 + 126	125 +		
c	1400 + 1450			

2 You could **split** the numbers. For example, 250 + 252 is the same as: 200 + 50 + 2 + 200 + 50. Fill in the gaps.

	Problem	Expand the numbers	Join the partners	Answer
e.g.	252 + 250	200 + 50 + 2 + 200 + 50	200 + 200 + 50 + 50 + 2 = 500 + 2	502
a	66 + 34	60 + 6 + 30 + 4	60 + 30 + 6 + 4 = 90 + 10	
b	140 + 230	100 + 40 + 200 + 30	100 + 200 + 40 + 30 = 300 + 70	
c	1250 + 2347			

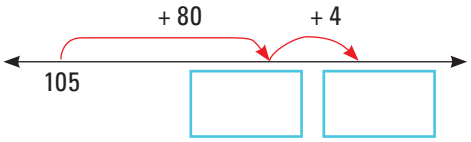
3 You could use the **jump strategy** on an empty number line:

e.g. What is 50 + 52?



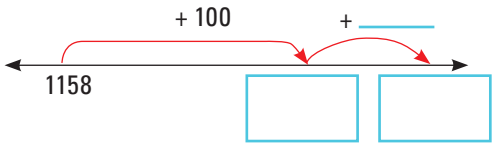
Answer: 50 + 52 = 102

a What is 105 + 84?



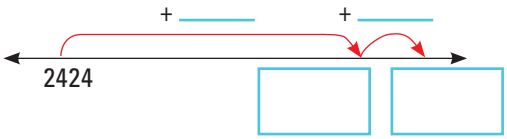
Answer: 105 + 84 = _____

b What is 1158 + 130?



Answer: 1158 + 130 = _____

c What is 2424 + 505?



Answer: 2424 + 505 = _____

Independent practice

1 Another mental strategy for adding is the compensation strategy. It uses **rounding**. For 74 + 19, we can round 19 to 20 and say 74 + 20. Use the compensation strategy to solve these.

	Problem	Using rounding it becomes:	Now I need to:	Answer
e.g.	74 + 19	74 + 20 = 94	take away 1	93
a	56 + 41	56 + 40 = 96	add 1	
b	25 + 69	25 + 70 = 95	take away 1	
c	125 + 62	125 + 60 = 185	add	
d	136 + 198	136 +		
e	195 + 249			
f	1238 + 501			
g	1645 + 1998			

2 Use the compensation strategy to solve these.

a 35 + 99 _____ **b** 24 + 101 _____

c 173 + 198 _____ **d** 1407 + 1002 _____

e 1451 + 1499 _____ **f** 1562 + 1004 _____

3 Use the jump strategy to solve these.

a 125 + 38 = ←——————————→

b 164 + 47 = ←——————————→

c 1193 + 842 = ←——————————→

d 2585 + 1321 = ←——————————→

4 Practise the split strategy with these addition problems.

	Problem	Expand the numbers	Join the partners	Answer
e.g.	125 + 132	100 + 20 + 5 + 100 + 30 + 2	100 + 100 + 20 + 30 + 5 + 2	257
a	173 + 125			
b	1240 + 2130			
c	5125 + 1234			
d	7114 + 2365			
e	2564 + 4236			

5 Use your choice of strategy to find the answer. Be ready to explain the strategy you used.

a 713 + 190 = _____

b 1490 + 1490 = _____

c 2009 + 2009 + 2009 = _____

d 1864 + 3134 = _____

e 2499 + 1002 = _____

f 1236 + 247 = _____

g 2499 + 2499 = _____

h 3130 + 2360 = _____

Extended practice

Improving your estimating and rounding skills can help you save time with mental calculations.

1 Look at these facts and figures. Show how you would round the numbers by underlining or highlighting one of the numbers.

	World fact	Metres	Rounded number
a	Krubera: the deepest cave in the world	2191 m	2100 or 2200?
b	Cehi: the tenth-deepest cave in the world	1502 m	1500 or 1600?
c	Mont Blanc: the highest mountain in Europe	4807 m	4800 or 4900?
d	Mont Maudit: the tenth-highest mountain in Europe	4466 m	4400 or 4500?
e	Mt Everest: the highest mountain in the world	8850 m	8800 or 8900?
f	Mt Kosciusko: the highest mountain in Australia	2228 m	2200 or 2300?
g	Mammoth Cave: the longest cave in the world.	590 600 m	500 000 or 600 000?
h	Wind Cave: the fourth-longest cave in the world	212 500 m	200 000 or 300 000?

2 Circle the number that will make the information correct.

a The total of the depths of Krubera and Cehi caves is about

3500 m, **3700 m**, **3600 m**, **3400 m**.

b Mont Blanc is about **20 m**, **200 m**, **30 m**, **300 m** taller than Mont Maudit.

c If you walked the lengths of the Mammoth Cave and the Wind Cave you would have travelled about **700 km**, **70 km**, **80 km**, **800 km**.

3 Sarah goes shopping in a bargain shop. She has $11 to spend. She goes to the checkout with these items:

Paint set: $1.99	Ball: 99c	Calculator: $1.99	Cuddly toy: $1.99
Pen set: $1.25	Notebook: 49c	Geometry set: $1.99	Stickers: $1.29

a To the nearest dollar, how much more than $11 is the total? ☐

b Which item should Sarah put back to be closest to a total of $11? _____

UNIT 1: TOPIC 3
Addition written strategies

	T	O
	3	4
+	2	5
	5	9

One of the most common written strategies for addition is to set the numbers out vertically. You start with the ones and add each column in turn.

Sometimes you need to trade from one column to the next.

	T	O
	$^{1}3$	8
+	2	5
	6	3

Guided practice

1 Complete the following.

a

	T	O
	2	6
+	2	3

b

	H	T	O
	1	3	3
+	1	4	1

c

	H	T	O
	3	7	5
+	1	2	3

d

	Th	H	T	O
	3	6	4	1
+	1	2	2	5

2 Complete the following.

a

	T	O
	$^{1}5$	7
+	2	9

b

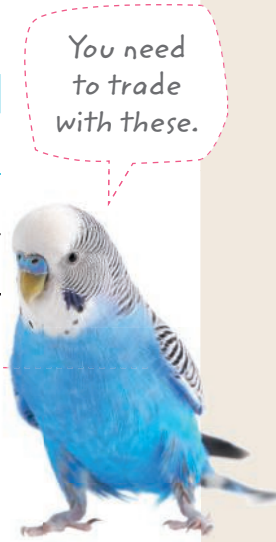
	H	T	O
	1	$^{1}2$	8
+	1	5	6

c

	H	T	O
	1	$^{1}3$	9
+	2	8	6

d

	H	T	O
	6	6	8
+	2	4	9



3 Start with the ones and add each column in turn.

a

	H	T	O
	2	4	9
+	1	3	7

b

	Th	H	T	O
	3	2	4	6
+	1	3	7	7

c

	Tth	Th	H	T	O
	3	2	2	8	6
+	1	5	5	3	7

d

	Tth	Th	H	T	O
	4	2	7	4	2
+	3	2	3	7	8

e

	Hth	Tth	Th	H	T	O
	4	3	4	5	3	6
+	2	6	5	5	9	5

Independent practice

1 Look for a pattern in the answers for each row.

a

	8	5
+	3	8

b

	5	3	8
+	6	9	6

c

	7	0	6	6
+	5	2	7	9

d

	8	7	2	3	9
+	3	6	2	1	7

e

	6	2
+	5	9

f

	1	5	8	9
+		7	4	3

g

	1	5	0	7	8
+	1	9	4	6	5

h

	2	4	8	9	3	6
+	2	0	7	7	1	8

i

	7	2
+	3	9

j

		9	2	4
+	1	2	9	8

k

	1	8	6	5	1
+	1	4	6	8	2

l

	1	8	6	1	2	8
+	2	5	8	3	1	6

2 Look for linking numbers to save time in written addition.

a

	2	7
	2	2
	2	3
+	1	8

b

	2	1	4
	1	3	1
	1	9	6
+	2	7	9

c

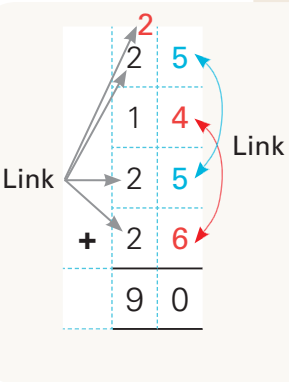
	1	8	4
	2	3	5
	2	2	6
+	1	7	0

d

	4	7	5
	1	0	1
	1	3	5
+	6	0	9

e

	5	9	3
	2	1	8
	8	9	8
+	5	9	8



3 On a holiday, Jack spent $295 on food, $207 on travel, $985 for his hotel, $92 on presents and $213 on entertainment. He wanted to know how much he had spent and used a calculator and found that the total was $1612.

a If you round the numbers, is Jack's answer reasonable?

b How much did Jack spend altogether?

When you write an addition problem vertically, it is important to keep the digits in the correct columns. If you don't, you will get the wrong answer.

	T	O	
	4	5	
+		3	7
	4	8	7

✗

	T	O
	1 4	5
+	3	7
	8	2

✓

4 Rewrite these problems vertically, then solve them.

a 114 + 137

	H	T	O
+			

b 927 + 138

	H	T	O
+			

c 739 + 278

	Th	H	T	O
+				

d 173 + 33 + 38

	H	T	O
+			

e 554 + 537 + 49

	Th	H	T	O
+				

f 637 + 77 + 829

	Th	H	T	O
+				

g 1452 + 257 + 2318

	Th	H	T	O
+				

h 35 174 + 257 + 2318 + 624

	Tth	Th	H	T	O
+					

i 61 286 + 435 + 24 + 325

	Tth	Th	H	T	O
+					

j 579 + 4529 + 33 + 6589 + 527

	Tth	Th	H	T	O
+					

Extended practice

1 Find four different solutions to make this addition correct.

a

	3	□	9
+		□	6
	□	3	□

b

	3	□	9
+		□	6
	□	3	□

c

	3	□	9
+		□	6
	□	3	□

d

	3	□	9
+		□	6
	□	3	□

2 A football team can have more than 200 000 spectators at their home games in a season.

Here is some information about one famous football team.

- Number of home games: 12.
- Total number of spectators: 212 052.
- Average attendance per home game: 17 671.
- Every game had more than 10 000 spectators.
- No games had exactly the same number of spectators.

List the possible number of spectators for each game. Make sure the total is 212 052. Use the grid to help you keep the numbers in columns.

Game	Possible number					
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
Total						

3 Find the total of 30 521 + 85 365 + 7570 and you will see that the digits in the answer make a pattern. Make three other three-line addition problems with the same answer.

Working-out space

UNIT 1: TOPIC 4
Subtraction mental strategies

Round numbers are easier to work with.

We could say 76 – 20 instead of 76 – 19.

76 – 20 = 56. We took away 1 too many, so we add 1 back to the answer.

So, 76 – 19 = 57

Guided practice

1 Use the compensation strategy (rounding) to solve these. Fill in the gaps.

	Problem	Using rounding, it becomes:	Now I need to:	Answer
e.g.	76 – 19	76 – 20 = 56	add 1 back	
a	53 – 21	53 – 20 = 33	take away 1 more	
b	85 – 28	85 – 30 = 55	add 2 back	
c	167 – 22	167 – 20 = 147	take away ____ more	
d	146 – 198	346 – ____		
e	1787 – 390			
f	5840 – 3100			
g	6178 – 3995			

Splitting numbers can make subtraction easier. For example, 479 – 135 = ?

- Split (expand) the number you are taking away: 135 becomes 100 + 30 and 5
- First take away 100: 479 – 100 = 379
- Next take away 30: 379 – 30 = 349
- Then take away 5: 349 – 5 = 344
- So, 479 – 135 = 344

2 Use the split strategy. Fill in the gaps.

	Problem	Expand the number	Take away the 1st part	Take away the 2nd part	Take away the 3rd part	Answer
e.g.	479 – 135	135 = 100 + 30 + 5	479 – 100 = 379	379 – 30 = 349	349 – 5 = 344	344
a	257 – 126	126 = 100 + 20 + 6	257 – 100 =			
b	548 – 224	224 =				
c	765 – 442					
d	878 – 236					
e	999 – 753					

Independent practice

1 Use the **compensation** strategy to solve these—or find your own sensible short cut.

a 47 – 22 _____

b 184 – 29 _____

c 547 – 231 _____

d 2455 – 1219 _____

e 5667 – 2421 _____

2 Use the **split** strategy to solve these—or find another short cut.

a 45 – 24 _____

b 464 – 343 _____

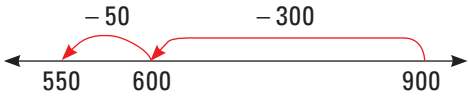
c 676 – 254 _____

d 5727 – 3325 _____

e 8958 – 5635 _____

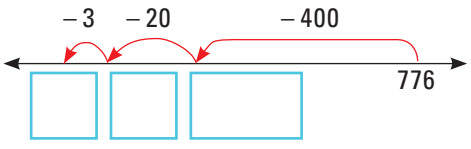
3 The split strategy can be used on an open number line. Fill in the gaps.

e.g. What is 900 – 350?



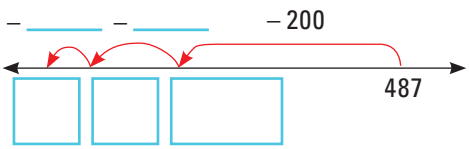
Answer: 900 – 350 = 550

a What is 776 – 423?



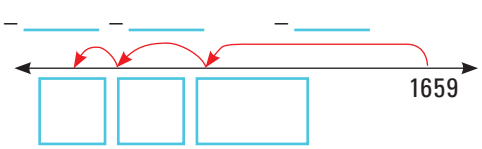
Answer: 776 – 423 = _____

b What is 487 – 264?



Answer: 487 – 264 = _____

c What is 1659 – 536?



Answer: 1659 – 536 = _____

Another strategy for subtraction is to count up.

Tina buys a sandwich for $3.75. She gives a $5 note. To work out the change, the shopkeeper starts at $3.75 and counts up to $5.

The difference between $3.75 and $5 is $1.25.

That is another way of saying $5 – $3.75 = $1.25.

4 Use the **counting-up** strategy to find the change if you paid for each item with a $10.

a a toy at $7.50 _____

b a book at $8.75 _____

c a melon at $3.50 _____

d a calculator at $4.45 _____

e a game at $5.35 _____

f a pencil set at $2.15 _____

You can also use the counting-up strategy to find the difference between ordinary numbers. For example, what is the difference between 200 and 155?

- 155 up to 160 is 5
- 160 up to 200 is 40

Altogether I counted up 45, so the difference between 200 and 155 is 45.

5 Use the counting-up strategy to work out the difference between these numbers.

a 100 – 57 = _____

b 150 – 128 = _____

c 200 – 135 = _____

d 151 – 118 = _____

e 1005 – 890 = _____

f 2500 – 2390 = _____

6 Use a mental strategy of your choice to find the answers to these problems. Be ready to explain the strategies you use.

a 89 – 19 = _____

b 65 – 14 = _____

c 78 – 21 = _____

d 150 – 75 = _____

e 1515 – 1220 = _____

f 2000 – 1450 = _____

Extended practice

1 A football game starts at 1:30 pm and ends at 3:05 pm. How long does it last?

2 The difference between two 3-digit numbers is 57. What might the numbers be?

3 Iva receives $2.45 change after paying with a note. Which banknote might have been used and how much was spent?

4 What is 4235 – 397? Explain how you got the answer.

5 Bob, Bill and Ben buy the same model of car from different dealers.

Bob pays $7464 for his car. Bill pays $193 more than Bob, but Bill pays $193 less than Ben.

How much do Bill and Ben pay for their cars?

6 Fill in the gaps to show three more ways to make the subtractions correct.

e.g.	6	1	3	–	5	3	5	=	7	8
a	6		3	–			5	=	7	8
b	6		3	–			5	=	7	8
c	6		3	–			5	=	7	8