

Writing 4-digit numbers



1 Draw a line to match each numeral to its correct name.

- | | | |
|---|---|-----------------|
| a | one thousand, six hundred and twenty-nine | 7192 |
| b | seven thousand, one hundred and ninety-two | 5913 |
| c | three thousand, three hundred and fifty-eight | 3358 |
| d | five thousand, nine hundred and thirteen | 1629 |
| e | four thousand, seven hundred and eighty-four | 4784 |

2 Write the numbers named in these sentences.

- | | | |
|---|--|------|
| a | Five thousand, six hundred and forty two people went to the stadium. | 5642 |
| b | The crowd ate one thousand, two hundred and thirty-one pies. | 1231 |
| c | They drank four thousand, nine hundred and fifty cans of drink. | 4950 |
| d | Two hundred and eleven flags were bought that afternoon. | 211 |

3 Use the word bank to write the numeral on each athlete's singlet in words.

Word bank

one	two	three	four	five
six	seven	eight	nine	ten
eleven	twelve	thirteen	fourteen	fifteen
sixteen	seventeen	eighteen	nineteen	twenty
thirty	forty	fifty	sixty	seventy
eighty	ninety	hundred	thousand	



two thousand six hundred and thirty one

one thousand seven hundred and sixty four

nine hundred and eighty seven

three thousand three hundred and twenty five

Research Find out how many athletes have competed at each of the modern Olympic Games. Write down your answers in numerals and words.

Representing 4-digit numbers

1 Write the number represented by the Base 10 material.



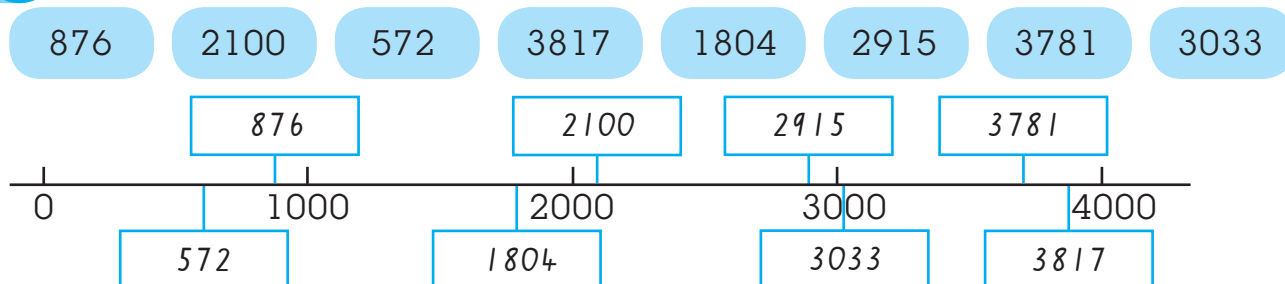
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Thousands	Hundreds	Tens	Ones	Number
				3476
				1185
				8549

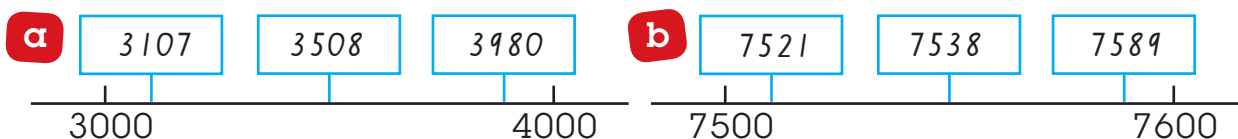
2 Make and then draw Base 10 materials to represent 2579 and 3256.

Thousands	Hundreds	Tens	Ones	Number
				2579
				3256

3 Place each number where it belongs along the number line.



4 Write 3 numbers that are between these numbers on the number line.

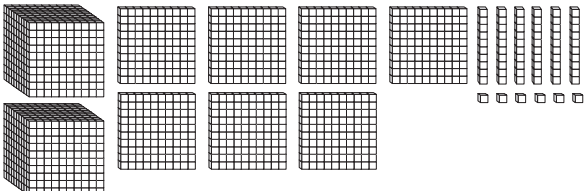
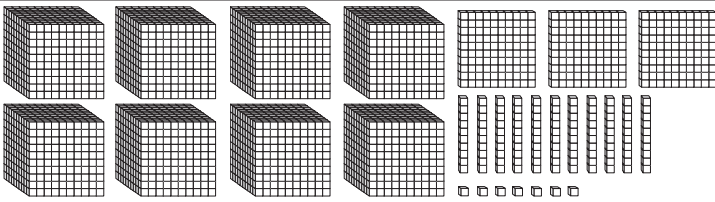
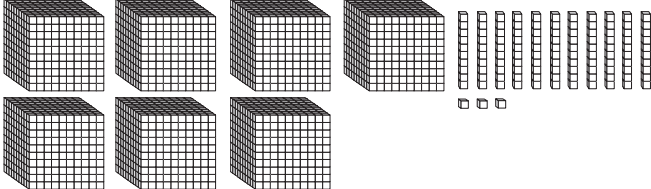


MiB 2
Card 8


2 Number and Place Value


Before and after


- 1 Write the number that is represented by each of the Base 10 materials. Write the number before and after it. The first one has been done for you.


Before	Number	After
2765		2767
8416		8418
7112		7114

- 2
- a Look at the swimmers about to start a race. Make each number using Base 10 materials.
- b Write the number before and after the number on each swimmer.

i 5425  5427

ii 7767  7769

iii 1858  1860

iv 5999  6001

- 3 Fill in the missing digits of these numbers which are in order.

a 213 0 2 1 37 21 7 8 b 12 0 3 127 2 1 3 75

c 71 1 9 713 8 7 2 31 d 7 999 90 0 0 900 8

How many different ways can 2, 3, 8 and 9 be written as a 4-digit number? Make a list. What about 1, 5, 7 and 0?

Try the same with your own 4-digit numbers. What do you notice?

MIB 2
Card 9


Ordering numbers

1 How many digits in each number? The first one has been done for you.

- a 132 3 b 4579 4 c 567 3
 d 40 2 e 12 2 f 3 1
 g 1326 4 h 7705 4 i 55 2


2 A group of skiers have just finished a race. Help them hang up their jackets, arranging the numbers from smallest to largest.

a




1414, 5176, 7614, 9382

b



69, 892, 6616, 8741

c



3007, 3070, 3700, 3730

3 Arrange the numbers from largest to smallest.

a 7890 8754 3276 1774 8754, 7890, 3276, 1774

b 3414 978 28 1442 3414, 1442, 978, 28

c 3098 3908 938 8093 8093, 3908, 3098, 938

4 Look at the table for the highest peak on every continent. Arrange the mountains in descending order of height.

Continent	Mountain	Height (m)
Africa	Kilimanjaro	5895
Antarctica	Vinson Massif	4892
Australia	Kosciuszko	2228
Asia	Everest	8848
Europe	Elbrus	5642
North America	Denali	6194
South America	Aconcagua	6962


Research

Conquering the highest peak on every continent is a great mission. Who was the first person to do this? What is the height of the second-highest peak on each continent?

8848, 6962, 6194, 5895, 5642, 4892, 2228

Comparing and counting

- 1 Use the greater than ($>$) or less than ($<$) sign to compare the numbers.

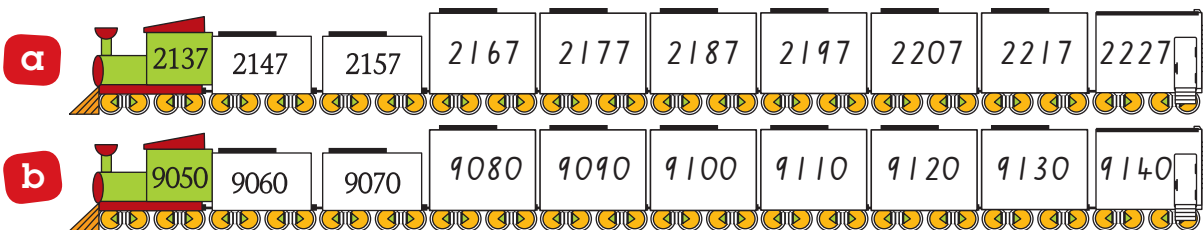
a $1245 < 5472$ b $2817 > 2732$ c $467 < 4076$  **3**

- 2 Name a number

a greater than 2035, but less than 2305. 2102

b less than 4080, but greater than 4008. 4040

- 3 Count forwards by 10 by adding a Base 10 long each time. Write the numbers in the carriages.



- 4 Count backwards by 10 by taking away a Base 10 long each time. Write the numbers in the table.

a	1765	1755	1745	1735	1725	1715	1705	1695
b	6042	6032	6022	6012	6002	5992	5982	5972

- 5 Count forwards by 100. Write the numbers in the carriages.



- 6 Fill in the missing numbers in the table when counting backwards by 100.

a	9970	9870	9770	9670	9570	9470	9370	9270
b	4412	4312	4212	4112	4012	3912	3812	3712

What 4-digit number am I? I am greater than 2000, but less than 3000.
I have place values of 6 hundreds and 3 tens. I am a multiple of 8.

MiB
Card 8

Odd and even

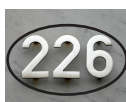
- 1 On the hundreds chart, colour odd numbers green and even numbers red.

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

- 2 Describe the pattern that is made on the hundreds chart.

columns of odd and even numbers alternate

- 3 Circle the signs that display an even number.



- 4 Continue these odd and even number patterns.

a	58	60	62	64	66	68	70	72
b	31	33	35	37	39	41	43	45
c	155	157	159	161	163	165	167	169
d	290	292	294	296	298	230	232	234

- 5 Explain why 14 is an even number and 41 is an odd number.

14 can be divided in to two parts evenly, 41 cannot.

- 6 Explain why the number 443 is odd. *443 cannot be divided into*

to equal parts

6 Number and Place Value

Odd and even 2

1 Place the numbers into the correct box in the table.



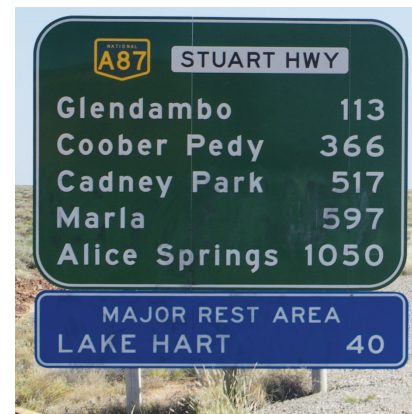
	odd	even
2-digit numbers	21	22, 16, 26, 48, 10
3-digit numbers	811	194

2 a What does this sign tell motorists?

Distance

b List 3 places that display a distance which is an odd number.

Glendambo, Cadney Park, Marla



c i How far is Alice Springs from this sign? *1050km*

ii Is this distance an odd or an even number? *even*

iii Explain how you know this. *ends with 0. 0 is an even*

number

3 a I'm thinking of a 3-digit number. Its hundreds digit is odd, and its tens and ones digits are even. What might the number be?

324

b I'm thinking of a 3-digit number. The digits are three consecutive odd numbers. What might the number be?

579

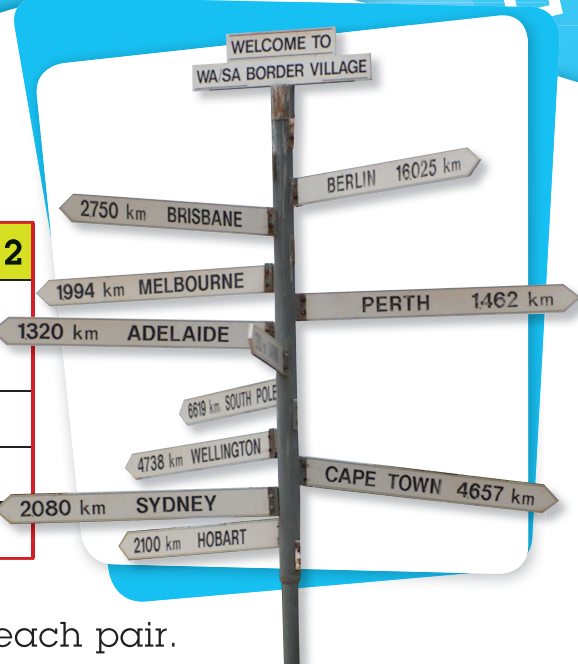
4 In your own words, explain why numbers that end in the digits 0, 2, 4, 6 and 8 are even and numbers ending in 1, 3, 5, 7 and 9 are odd.

Students' answers will vary

Place value

- 1 Look at the signpost and fill in the table.

City	Distance to	Place value of the 2
Adelaide	1320Km	<i>ten</i>
Brisbane	2750Km	<i>thousand</i>
Hobart	2100Km	<i>thousand</i>
Perth	1462Km	<i>one</i>
Sydney	2080Km	<i>thousand</i>



- 2 Colour the city closest to the signpost in each pair.

a	Sydney	Adelaide	b	Hobart	Perth
c	Brisbane	Sydney	d	Adelaide	Perth

- 3 Which city has a distance to it with the following place values?

a	8 tens	<u>Sydney</u>	b	9 hundreds	<u>Melbourne</u>
c	2 ones	<u>Perth</u>	d	4 thousands	<u>Wellington</u>

- 4 Look at the blank signpost.

- a Fill in the places and distances as follows from top to bottom.

Lily Town 285 km

Roseville 1728 km

Port Aster 1840 km



- b What is the place value of the 8 in each place?

i	Lily Town	<u>tens</u>
ii	Roseville	<u>ones</u>
iii	Port Aster	<u>hundred</u>

- 5 Is it further to travel from Lily Town to Roseville or from Lily Town to Port Aster? Give reasons for your answer.

It is furthest to travel from Lily Town to Roseville as they are in opposite directions.

The role of zero

It is not necessary to begin a whole number with a zero.

1 What is the place value of the zero in each of these numbers?

- | | | |
|--------------------|------------------------|--------------------|
| a 4740 <u>ones</u> | b 1082 <u>hundreds</u> | c 2607 <u>tens</u> |
| d 6550 <u>ones</u> | e 304 <u>tens</u> | f 108 <u>tens</u> |
| g 90 <u>ones</u> | h 6061 <u>hundreds</u> | i 40 <u>ones</u> |

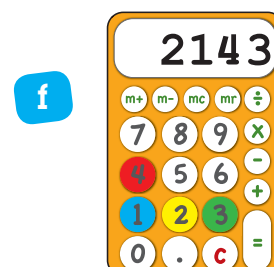
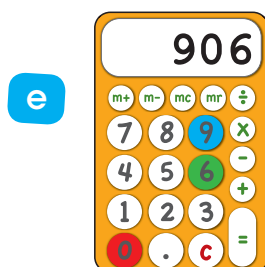
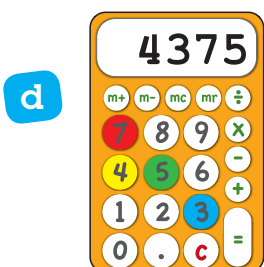
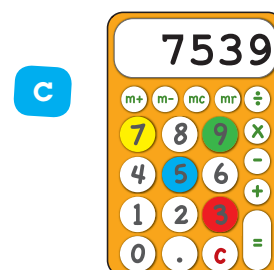
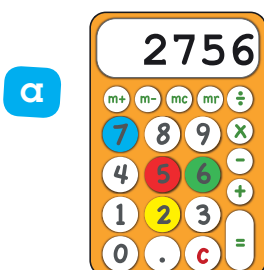
2 Colour the keys on each calculator that you would press to display these numbers. Use this colour code:

Thousands

Hundreds

Tens

Ones



3 Which of the above calculators has a number closest to the following numbers?

- | | |
|-----------------|-----------------|
| a 4000 <u>d</u> | b 9000 <u>b</u> |
| c 1000 <u>e</u> | d 2000 <u>f</u> |
| e 3000 <u>a</u> | f 8000 <u>c</u> |

In how many ways can 0, 2, 4 and 8 be written as a 4-digit number? Write down all the numbers you made in ascending order.

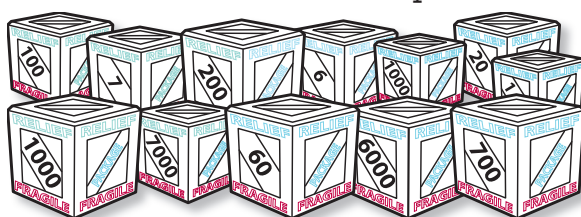
2048	4028	8024
2084	4082	8042
2408	4208	8204
2480	4280	8240
2804	4802	8402
2840	4820	8420

Expanded notation

1 Write the numbers onto the numeral expanders.

a	2351 =	2	thousands	3	hundreds	5	tens	1	ones
b	9907 =	9	thousands	9	hundreds	0	tens	7	ones

2 This plane is dropping relief supplies to a flooded township. Colour the boxes that have the same value as one of the digits in the number on the plane.



Did you know that the Boeing 747-400 has a maximum speed of 1093 km/h?

3 Write the numbers in expanded notation. The first one has been done for you.

- a $6529 = 6000 + 500 + 20 + 9$
- b $1976 = \underline{1000 + 900 + 70 + 6}$
- c $2340 = \underline{2000 + 300 + 40}$
- d $7063 = \underline{7000 + 60 + 3}$

Tell a partner about the number 1093.

4 Write the expanded notation as a 4-digit number.

- a $4000 + 500 + 70 + 2 = \underline{4572}$
- b $2000 + 900 + 90 + 1 = \underline{2991}$
- c $8000 + 400 + 30 = \underline{8430}$
- d $5000 + 40 + 6 = \underline{5046}$

5 Colour the larger number in each pair.

- a $5000 + 60 + 1$ $5000 + 100 + 2$
- b $4000 + 40 + 4$ $4000 + 100$

6 This calculator shows the number 6284. What would you add to make:



- a the 4 into an 8? $\underline{4}$
- b the 8 into a 9? $\underline{10}$
- c the 2 into a 5? $\underline{300}$
- d the 6 into a 7? $\underline{1000}$

Rounding numbers

When rounding to the nearest thousand, numbers that end in 499 or less round down and numbers that end in 500 or more round up.

When rounding to the nearest hundred, numbers that end in 49 or less round down and numbers that end in 50 or more round up.








1 **a** Colour the numbers that round to 2000.

2100	3100	2925	1778	2001	2535	2600	1498
------	------	------	------	------	------	------	------

b Colour the numbers that round to 3400.

3410	3440	3335	3040	3510	3389	3452	3350
------	------	------	------	------	------	------	------

2 Round each item to the nearest thousand dollars.

				
plasma TV	scooter	laptop	boat	camera
\$4399	\$8930	\$1870	\$5450	\$2580
\$ <u>4000</u>	\$ <u>9000</u>	\$ <u>2000</u>	\$ <u>5000</u>	\$ <u>3000</u>

3 Round each item to the nearest hundred dollars.

				
lounge	dining table	bed	desk	antique trunk
\$2430	\$3180	\$4867	\$1129	\$969
\$ <u>2400</u>	\$ <u>3200</u>	\$ <u>4900</u>	\$ <u>1100</u>	\$ <u>1000</u>

4 Can you think of a number that when it is rounded to the nearest:

- a** thousand becomes 5000? 4889
- b** hundred becomes 5000? 4963
- c** ten becomes 5000? 4998



To the nearest hundred, 2345 rounds to 2300. How many numbers rounded to the nearest hundred become 2300?

MiB
Card 13

More rounding

1

a Round these numbers to the nearest 10.

i 34 30 **ii** 176 180 **iii** 772 770

b Round these numbers to the nearest 100.

i 161 200 **ii** 1422 1400 **iii** 6681 6700

2

The radius of Earth is 6371 km. Is 6371 closer to:

a 6000 or 7000? 6000

b 6300 or 6400? 6400

c 6370 or 6380? 6370



3

This table shows the longest river on each continent.

Continent	River	Length (km)	Round to the nearest		
			Thousand	Hundred	Ten
Africa	Nile	6650	7000	6700	6650
Asia	Yangtze	6300	6000	6300	6300
Australia	Darling	2739	3000	2700	2740
Europe	Volga	3692	4000	3700	3690
North America	Mississippi	3734	4000	3700	3730
South America	Amazon	6400	6000	6400	6400

a Round each length up or down to the nearest thousand, hundred and ten kilometres.

b Which river has a length closest to 7000 km? Nile

c Which river has a length closest to 3000 km? Darling

d Order the rivers from longest to shortest in length.

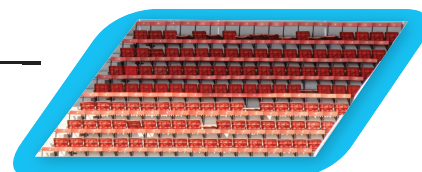
Nile, Amazon, Yangtze, Mississippi, Volga, Darling

4

Estimate to the nearest hundred the number of chairs that you can see in this section of the stadium. 150

How did you decide on this number?

Students' answers will vary.



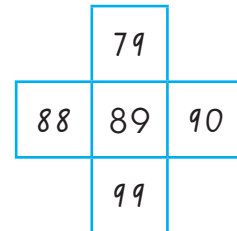
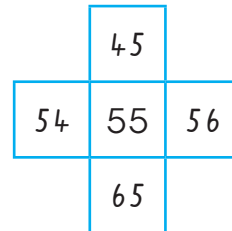
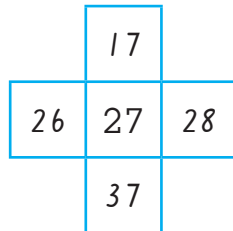
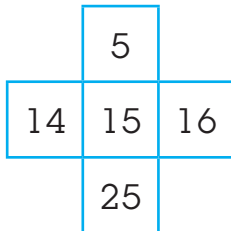
MiB 2
Cards
10 & 16

12

Number and Place Value

Addition on the hundreds chart

- 1 Look at these jigsaw pieces from the hundreds chart and fill in the missing numbers. The first one has been done for you.



- 2 Using the information in Question 1, what is:

- a 1 more than 15? 16 b 1 more than 55? 56
 c 1 less than 15? 14 d 1 less than 55? 54

- 3 Using the information in Question 1, what is:

- a 10 more than 27? 37 b 10 more than 89? 99
 c 10 less than 27? 17 d 10 less than 89? 79

- 4 Use the information in Question 1 to help you answer these.

- a $27 + 1 = 28$ b $89 + 1 = 90$ c $15 + 10 = 25$ d $55 + 10 = 65$
 e $27 - 1 = 26$ f $89 - 1 = 88$ g $15 - 10 = 5$ h $55 - 10 = 45$

- 5 Use the hundreds chart to answer these.

- a $34 + 1 = 35$ b $76 + 10 = 86$
 c $72 - 1 = 71$ d $42 - 10 = 32$
 e $80 - 10 = 70$

- 6 Use the hundreds chart.

- a Start at 14, add 10.
Colour this number blue.
 b Start at 36, add 20.
Colour this number red.
 c Start at 42, subtract 10.
Colour this number yellow.
 d Start at 78, subtract 20.
Colour this number brown.
 e Start at 21, add 50.
Colour this number pink.

Hundreds chart

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

Jump strategies

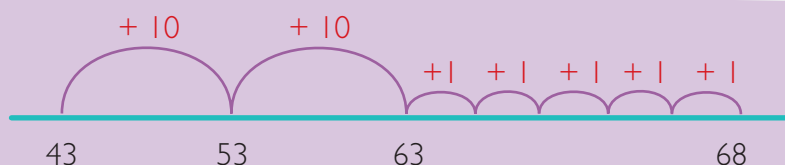
1 Skip count by 10 to complete each pattern.

a	2	12	22	32	42	52	62	72	82	92
b	7	17	27	37	47	57	67	77	87	97
c	5	15	25	35	45	55	65	75	85	95
d	1	11	21	31	41	51	61	71	81	91

Jump strategy

$$43 + 25 = 43 + 20 + 5$$

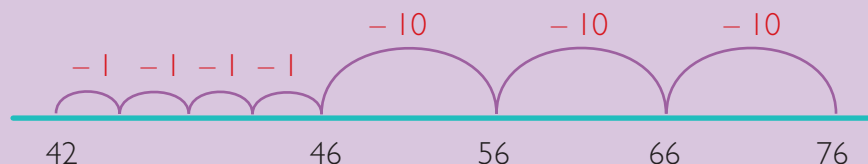
$$= 63 + 5 = 68$$



Write the first number on an empty number line. Count forwards or backwards by tens first and then by ones to perform the calculation.

$$76 - 34 = 76 - 30 - 4$$

$$= 46 - 4 = 42$$



2 Solve these number sentences using the jump strategy. Record your answers on the open number line.

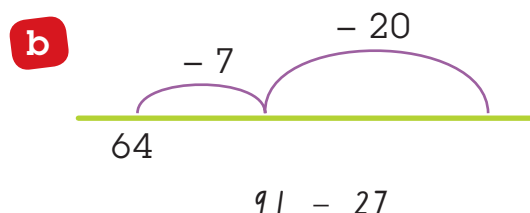
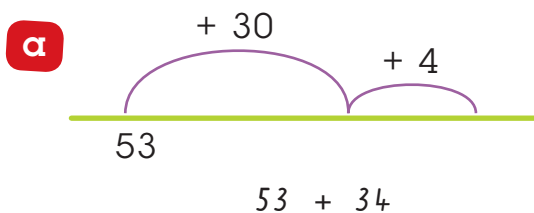
a $23 + 31 =$

b $68 + 25 =$

c $53 - 22 =$

d $92 - 67 =$

3 Rakesh wrote his solutions on an open number line using the jump strategy. What number sentences was he asked to solve?



What did you find easy or not so easy about the jump strategy?

Split strategy

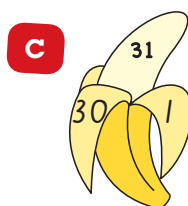
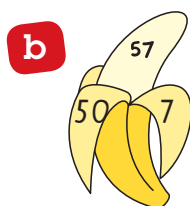
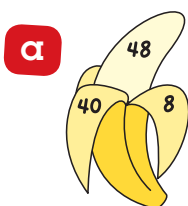
- 1** Split each number into tens and ones. The first one has been started for you.

Split strategy: $43 + 25$

First split each number into tens and ones. $40 + 3 + 20 + 5$
 Add the tens first. $40 + 20 = 60$
 Add the ones. $3 + 5 = 8$
 Add the two answers. $60 + 8 = 68$
 $43 + 25 = 68$



2



$27 + 12 =$	$20 + 7 + 10 + 2 = 39$
$31 + 65 =$	$30 + 1 + 60 + 5 = 96$
$44 + 53 =$	$40 + 4 + 50 + 3 = 97$
$72 + 26 =$	$70 + 2 + 20 + 6 = 98$



What did you find easy or not so easy about the split strategy?

3

Look at the grid. Link two numbers horizontally or vertically.

3	45	15
17	12	54
20	38	11

- a** Write down some links which total more than 50.

45 + 15 54 + 15 20 + 38

- b** Write down some links which total less than 50.

3 + 17 17 + 20 45 + 3

- c** Write down a link that totals 50. 38 + 12

- d** What is the smallest total you can find? 20

- e** What is the largest total you can find? 69

- f** Write down as many totals as possible. Are the totals odd or even?

Odd totals		Even totals	
$38 + 11 = 49$	$11 + 38 = 49$	$3 + 45 = 48$	$3 + 17 = 20$
$17 + 20 = 37$	$54 + 11 = 65$	$45 + 15 = 60$	$20 + 38 = 58$
$15 + 54 = 69$		$12 + 54 = 66$	
$17 + 12 = 29$			

Add and subtract

- 1 a Add any two of these numbers in your head.





38 23 41 17 $\underline{38} + \underline{41} = \underline{79}$

How did you work it out? *Students' answers will vary.*

- b Subtract one of the above numbers from 58. $58 - \underline{23} = \underline{35}$

How did you work it out? *Students' answers will vary.*

- 2 Solve these problems. Check your answers with a calculator.

		Working out
a	Bec scored 32 goals and Shane scored 27 goals. How many goals did they score altogether?	 $\begin{array}{r} + 32 \\ 27 \\ \hline 59 \end{array}$
b	Alan had 78 golf balls in his golf bag. He lost 15 during a round of golf. How many did he have left?	 $\begin{array}{r} 78 \\ - 15 \\ \hline 63 \end{array}$
c	Abhi hit 59 runs and Pritha hit 43 runs. How many runs did they hit altogether?	 $\begin{array}{r} + 59 \\ 43 \\ \hline 102 \end{array}$
d	Indri likes to watch Steven play soccer. His team has already scored 56 goals this season. How many more do they need to reach 80?	 $\begin{array}{r} 80 \\ - 56 \\ \hline 24 \end{array}$

- 3 Add across and down to find the totals. Write down how you worked it out.

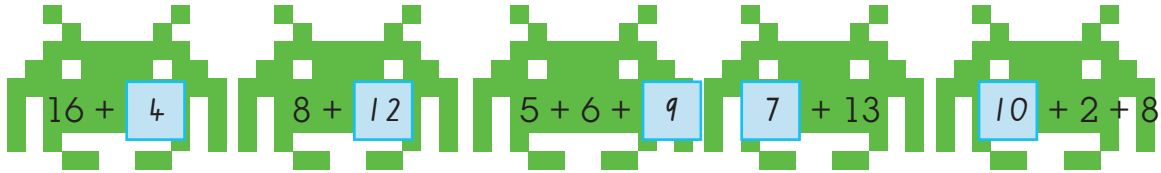
16	31	47
23	35	58
39	66	

Students' answers will vary.

Which strategy do you prefer to use?

Addition to multiples of 10

- 1 Each space invader can be destroyed if the answer is 20. Fill in the blanks to destroy the space invaders.



- 2 These space invaders are destroyed if their sum is 50. Write pairs of numbers which add to 50.



12 38; 41 9; 30 20; 35 15

- 3 Look at the prices of each container of cream or lotion.



- a Which two have a sum of \$60? B, D
- b Which two have a difference of \$30? A, C
- c Which two have a sum close to \$40? C, F
- d Which two have a difference close to \$20? A, B

- 4 Reduce the price of each item by \$10. Write it onto the container.

If you have \$100, can you buy all the items at the reduced price? Show your working and explain your answer.

Students' answers will vary.

Regrouping using bridging strategies



7

Bridging to 10

Break up the number being added so that it adds to an even 10 to make the addition easier.

$$25 + 8 = 25 + \overset{8}{\textcircled{5+3}} = \overset{30}{\textcircled{25+5}} + 3 = 33$$

1 Try bridging to 10 with the following. The first one is done for you.

a $16 + 7 = 16 + \overset{7}{\textcircled{4+3}} = \overset{20}{\textcircled{16+4}} + 3 = \underline{23}$

b $27 + 5 = \underline{\hspace{2cm}} \quad \textcircled{27+3} + 2 = 32$

c $37 + 9 = \underline{\hspace{2cm}} \quad \textcircled{37+3} + 6 = 46$

d $9 + 8 = \underline{\hspace{2cm}} \quad \textcircled{9+1} + 7 = 17$

2 Try doing these in your head.

a $18 + 8 = \underline{26}$

b $29 + 5 = \underline{34}$

c $37 + 6 = \underline{43}$

3 Explain how you could use the bridging strategy to solve these.

a $35 + 18 = \underline{53}$

b $37 + 15 = \underline{52}$

Bridging the decades: Add the tens first, then use bridging. $27 + 18 = 37 + 8 = 37 + 3 + 5 = 45$

4 Try doing these in your head.

a $39 + 12 = \underline{51}$

b $48 + 14 = \underline{62}$

c $57 + 25 = \underline{82}$

5 Braille is a writing system of raised dots used by people who cannot see well.

a Using Braille, write down the numeral.

i 15 $\underline{\hspace{2cm}}$ ii 27 $\underline{\hspace{2cm}}$ iii 34 $\underline{\hspace{2cm}}$

b Calculate the following number sentences and write the answer in Braille.

i $5 + 4 = \underline{\hspace{2cm}}$ ii $8 - 1 = \underline{\hspace{2cm}}$
 iii $6 + 8 = \underline{\hspace{2cm}}$ iv $19 - 4 = \underline{\hspace{2cm}}$
 v $28 + 7 = \underline{\hspace{2cm}}$ vi $43 - 9 = \underline{\hspace{2cm}}$

Numbers in Braille

0		1	
2		3	
4		5	
6		7	
8		9	

More mental strategies

Another way to add quickly is to look for 2 numbers that add to a **multiple of 10**.

$$\begin{aligned} (14) + 8 + (6) &= 14 + 6 + 8 \\ &= 20 + 8 = 28 \end{aligned}$$

Addends are the numbers to be added together to find the **sum**.

- 1 Circle the 2 numbers which add to make a multiple of 10 to help you complete these number sentences.

a $(17) + 9 + (3) = \underline{29}$ b $1 + (15) + (5) = \underline{21}$ c $(19) + 7 + (1) = \underline{27}$
 d $(23) + (7) + 4 = \underline{34}$ e $(33) + 2 + (7) = \underline{42}$ f $11 + (62) + (8) = \underline{81}$

- 2 In a game of darts each player had 3 shots. Who scored the highest total?

Player	Dart 1	Dart 2	Dart 3	Total
Margarita	17	3	24	44
Valerie	33	5	7	45
Theo	26	11	9	46



Partitioning (compensation strategy)

Round to the nearest 10 and then add or subtract the amount that was rounded.

$63 + 29 = 63 + 30$ is 93, subtract 1, to obtain 92
 $27 + 18 = 27 + 20$ is 47, subtract 2, to obtain 45
 $54 - 39 = 54 - 40$ is 14, add 1, to obtain 15

- 3 Explain how you could use the partitioning (compensation strategy) to solve these.

a $25 + 19 = \underline{\hspace{2cm}} \quad 44$
 b $43 + 29 = \underline{\hspace{2cm}} \quad 72$
 c $35 + 18 = \underline{\hspace{2cm}} \quad 53$
 d $43 - 19 = \underline{\hspace{2cm}} \quad 24$
 e $67 - 29 = \underline{\hspace{2cm}} \quad 38$

- 4 Pretend the 9 key on your calculator is broken. Write how you could use your calculator to find the answer to this number sentence.







$24 + 39 = \underline{63}$ $24 + 38 + 1 = \underline{63}$

Solve problems

1

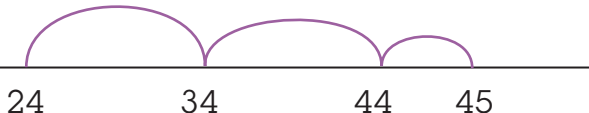



Solve these food addition and subtraction problems. Use a calculator to check your solution.

	Problem	Working out
a	Gina works at the circus. She cooked 28 hotdogs on Saturday and 59 hotdogs on Sunday. How many did she cook over the weekend? 	$\begin{array}{r} 59 \\ + 28 \\ \hline 87 \end{array}$
b	Sue loves chocolate. She bought a block with 64 pieces. If she has already eaten 19 pieces, how many pieces does she have left? 	$\begin{array}{r} 64 \\ - 19 \\ \hline 45 \end{array}$
c	How much does the meal cost if the entrée is \$18 and the main meal is \$39? 	$\begin{array}{r} 39 \\ + 18 \\ \hline 57 \end{array}$
d	This bunch of grapes has 85 grapes. If Ruth eats 28 grapes at breakfast time, how many grapes will be left? 	$\begin{array}{r} 85 \\ - 28 \\ \hline 57 \end{array}$

2

Write a number problem for each of the following.

	Problem	Problem
a		$24 + 25$
b		$96 - 35$
c	The answer is 56.	$19 + 37$

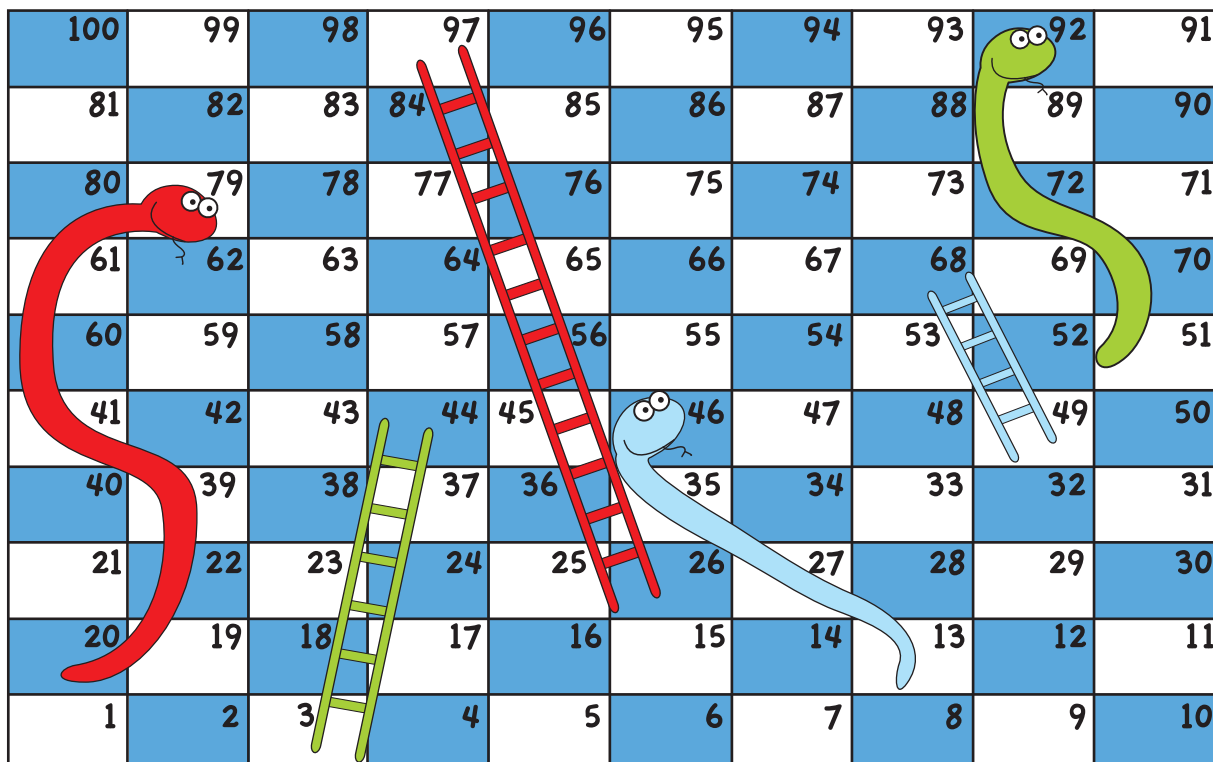
In 148, the 3 digits add to 13. List other numbers between 100 and 200 that have digits that add to 13.

139 175
157 184
166 193

Apply mental strategies

1

In a game of Snakes and Ladders you climb ladders and slide down snakes.



Using different mental strategies, calculate the value of each snake and each ladder. The first one has been done for you.



Which strategy do you prefer to use?

	Working
blue ladder	$68 - 49 = 68 - 50 + 1 = 18 + 1 = 19$
red ladder	$97 - 26 = 71$
green ladder	$44 - 3 = 41$
blue snake	$46 - 13 = 33$
red snake	$79 - 20 = 59$
green snake	$92 - 51 = 41$



Play a game of Snakes and Ladders and write about the numbers you landed on when you slid down snakes and climbed ladders.

The equals sign

- 1 Terry is a bricklayer. Can you help him fill up the brick wall with different ways to make 20? Try using different operations (+, −, × and ÷). The first two have been done for you.



8

4×5	$22 - 2$	10×2	$40 \div 2$	$12 + 8$	
$23 - 3$	$100 \div 5$	$40 - 20$	$8 + 12$	$5 + 15$	$25 - 5$
$6 + 14$	$3 + 17$	$13 + 7$	$27 - 7$	$45 - 25$	
$12 + 8$	$500 \div 25$	$1 + 19$	$32 - 22$	$100 - 80$	$10 + 10$
$1010 - 990$	$320 - 300$	$28 - 8$	$4 + 16$	$7 + 13$	
$120 - 100$	$90 - 70$	$82 - 62$	$11 + 9$	$16 + 4$	$52 - 32$
$66 - 46$	$91 - 71$	$55 - 35$	$24 - 4$	$31 - 11$	

Use the equals sign to show the relationship between some of the above number sentences, e.g. $4 \times 5 = 22 - 2$

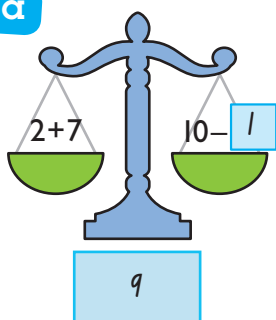
$$10 \times 2 = 40 \div 2, 13 + 7 = 27 - 7$$

Scales will balance if both sides are equal. Both sides of a number sentence are also equal. The equals sign is also used to record equivalent number relationships, e.g. $4 + 7 = 12 - 1$. The equals sign (=) means 'is the same as'.

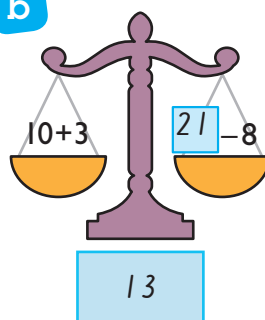


- 2 Fill in the missing numbers to make the scales balance. Write the answer below the scales to make it easier.

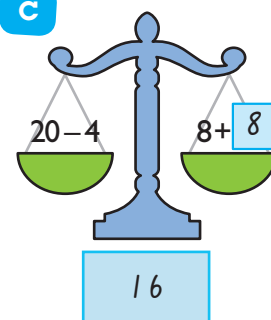
a



b



c



Equivalent number sentences

1 Fill in the missing numbers to make the scales balance. Write the answer next to the scales to make it easier.

a

b

c

d

e

f

2 Zoe wrote some equivalent number sentences, but not all of them are correct. Tick (✓) those which are correct and cross (✗) those which are incorrect.

Zoe's number sentences

a $12 \times 2 = 18 + 8$	_____ ✗	b $13 + 12 = 5 \times 5$	_____ ✓
c $10 \div 5 = 17 - 14$	_____ ✗	d $32 - 17 = 0 + 15$	_____ ✓
e $81 - 6 = 65 + 10$	_____ ✓	f $2 \times 20 = \frac{1}{2} \text{ of } 80$	_____ ✓
g Double 7 = $60 - 36$	_____ ✗	h $\frac{1}{2} \text{ of } 32 = 4 + 5 +$	_____ ✗

3 Match the equivalent number sentences.

Double 13	42 - 4
Half of 100	5 × 10
25 + 13	9 + 9 + 1
20 + 40	20 + 2 + 4
38 ÷ 2	30 ÷ 2
5 + 5 + 5	Triple 20

4 Fill in two numbers to make the scales balance.

a

b

Could different numbers be used to make them balance?

Two numbers multiply to give 24 and add to give 10. What are the two numbers?

The algorithm

An algorithm is the formal way of setting out a mathematical problem to work out the answer. This is an addition algorithm.

$$\begin{array}{r} 43 \\ + 51 \\ \hline 94 \end{array}$$

- 1 Complete these addition algorithms. The first one has been done for you.

a

$$\begin{array}{r} \text{T} \quad \text{O} \\ 1 \quad 3 \\ + 2 \quad 5 \\ \hline 3 \quad 8 \end{array}$$

b

$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 2 \\ + 4 \quad 2 \\ \hline 6 \quad 4 \end{array}$$

c

$$\begin{array}{r} \text{T} \quad \text{O} \\ 3 \quad 1 \\ + 3 \quad 6 \\ \hline 6 \quad 7 \end{array}$$

d

$$\begin{array}{r} \text{T} \quad \text{O} \\ 1 \quad 8 \\ + 5 \quad 1 \\ \hline 6 \quad 9 \end{array}$$

e

$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 7 \\ + 3 \quad 2 \\ \hline 5 \quad 9 \end{array}$$

f

$$\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 3 \\ + 3 \quad 0 \\ \hline 7 \quad 3 \end{array}$$

g

$$\begin{array}{r} 4 \quad 1 \\ + 1 \quad 6 \\ \hline 5 \quad 7 \end{array}$$

h

$$\begin{array}{r} 7 \quad 2 \\ + 1 \quad 4 \\ \hline 8 \quad 6 \end{array}$$

i

$$\begin{array}{r} 1 \quad 9 \\ + 6 \quad 0 \\ \hline 7 \quad 9 \end{array}$$

j

$$\begin{array}{r} 5 \quad 5 \\ + 3 \quad 3 \\ \hline 8 \quad 8 \end{array}$$

k

$$\begin{array}{r} 6 \quad 2 \\ + 2 \quad 7 \\ \hline 8 \quad 9 \end{array}$$

l

$$\begin{array}{r} 6 \quad 0 \\ + 3 \quad 4 \\ \hline 9 \quad 4 \end{array}$$

- 2 Complete these subtraction algorithms. The first one has been done for you.

a

$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 4 \\ - 1 \quad 3 \\ \hline 1 \quad 1 \end{array}$$

b

$$\begin{array}{r} \text{T} \quad \text{O} \\ 3 \quad 2 \\ - 1 \quad 1 \\ \hline 2 \quad 1 \end{array}$$

c

$$\begin{array}{r} \text{T} \quad \text{O} \\ 5 \quad 7 \\ - 2 \quad 5 \\ \hline 3 \quad 2 \end{array}$$

d

$$\begin{array}{r} \text{T} \quad \text{O} \\ 8 \quad 4 \\ - 6 \quad 3 \\ \hline 2 \quad 1 \end{array}$$

e

$$\begin{array}{r} \text{T} \quad \text{O} \\ 5 \quad 4 \\ - 3 \quad 4 \\ \hline 2 \quad 0 \end{array}$$

f

$$\begin{array}{r} \text{T} \quad \text{O} \\ 3 \quad 9 \\ - 1 \quad 8 \\ \hline 2 \quad 1 \end{array}$$

g

$$\begin{array}{r} 9 \quad 5 \\ - 4 \quad 3 \\ \hline 5 \quad 2 \end{array}$$

h

$$\begin{array}{r} 4 \quad 4 \\ - 2 \quad 4 \\ \hline 2 \quad 0 \end{array}$$

i

$$\begin{array}{r} 7 \quad 8 \\ - 6 \quad 1 \\ \hline 1 \quad 7 \end{array}$$

j

$$\begin{array}{r} 4 \quad 1 \\ - 3 \quad 0 \\ \hline 1 \quad 1 \end{array}$$

k

$$\begin{array}{r} 6 \quad 7 \\ - 2 \quad 6 \\ \hline 4 \quad 1 \end{array}$$

l

$$\begin{array}{r} 6 \quad 3 \\ - 4 \quad 3 \\ \hline 2 \quad 0 \end{array}$$

- 3 Solve these problems by using an algorithm.

	Problem	Is it addition or subtraction?	Algorithm	Solution
a	Emmy collects toy cars. She has 43 green cars and 16 red cars. How many cars does she have altogether?	<i>addition</i>	$43 + 16$	59
b	Andrew had 39 candles on his cake. He blew out 15. How many are still alight?	<i>subtraction</i>	$39 - 15$	24
c	Dom's mobile phone bill is \$32 and Lizza's is \$55. What is the total cost of both bills?	<i>addition</i>	$32 + 55$	87

Trading in addition

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 2 & 8 \\ 3 & 4 \\ \hline 6 & 2 \end{array}$$

8 ones plus 4 ones equals 12 ones.
Trade 10 ones for 1 ten. Two ones remain.
Record 2 in the ones column and 1 ten in the tens column.
Add 2 tens plus 3 tens plus one ten to get 6 tens.
Record 6 in the tens column.

- 1 Complete these addition algorithms. The first one has been done for you.

a

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 1 & 7 \\ 2 & 5 \\ \hline 4 & 2 \end{array}$$

b

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 2 & 8 \\ 3 & 4 \\ \hline 6 & 2 \end{array}$$

c

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 3 & 3 \\ 3 & 9 \\ \hline 7 & 2 \end{array}$$

d

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 1 & 8 \\ 5 & 6 \\ \hline 7 & 4 \end{array}$$

e

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 2 & 7 \\ 3 & 7 \\ \hline 6 & 4 \end{array}$$

f

$$\begin{array}{r|l} \text{T} & \text{O} \\ + & \\ \hline 4 & 7 \\ 3 & 4 \\ \hline 8 & 1 \end{array}$$

g

$$\begin{array}{r|l} & \text{T} & \text{O} \\ + & & \\ \hline 4 & 1 & \\ 1 & 9 & \\ \hline 6 & 0 & \end{array}$$

h

$$\begin{array}{r|l} & \text{T} & \text{O} \\ + & & \\ \hline 7 & 6 & \\ 1 & 4 & \\ \hline 9 & 0 & \end{array}$$

i

$$\begin{array}{r|l} & \text{T} & \text{O} \\ + & & \\ \hline 1 & 9 & \\ 6 & 3 & \\ \hline 8 & 2 & \end{array}$$

j

$$\begin{array}{r|l} & \text{T} & \text{O} \\ + & & \\ \hline 5 & 5 & \\ 3 & 5 & \\ \hline 9 & 0 & \end{array}$$

k

$$\begin{array}{r|l} & \text{T} & \text{O} \\ + & & \\ \hline 6 & 7 & \\ 2 & 7 & \\ \hline 9 & 4 & \end{array}$$

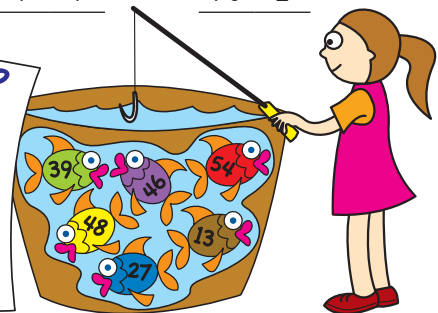
l

$$\begin{array}{r|l} & \text{T} & \text{O} \\ + & & \\ \hline 6 & 4 & \\ 3 & 8 & \\ \hline 10 & 2 & \end{array}$$

- 2 In the lucky dip stall at the carnival, you need to catch two fish and add their numbers together to see if you have won a prize.

- a** Fill in the table below.

LUCKY DIP	
Score	Prize
61	kite
66	book
73	ball
93	camera
other scores	no prize



Fish caught	Algorithm	Prize
blue fish and purple fish	$27 + 46 = 73$	ball
green fish and yellow fish	$39 + 48 = 87$	no prize
brown fish and yellow fish	$13 + 48 = 61$	kite

- b** What two fish need to be caught to win the camera? Show your working.

green and red

$$39 + 54 = 93$$

Trading in subtraction

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{4}{\cancel{5}} & \overset{1}{\cancel{6}} \\ - & 1 \quad 9 \\ \hline 3 & 7 \end{array}$$

Take 9 ones from 6 ones

Trade 1 ten from the tens column (5 tens becomes 4 tens).
Move it to the ones column to make 16 ones.

16 ones take away 9 ones is 7 ones.
4 tens take away 1 ten is 3 tens.

- 1 Complete these subtraction algorithms. The first one has been started for you.

a

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{2}{\cancel{3}} & \overset{1}{\cancel{2}} \\ - & 1 \quad 8 \\ \hline 1 & 4 \end{array}$$

b

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{3}{\cancel{4}} & \overset{1}{\cancel{1}} \\ - & 1 \quad 4 \\ \hline 2 & 7 \end{array}$$

c

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{2}{\cancel{3}} & \overset{1}{\cancel{3}} \\ - & 1 \quad 7 \\ \hline 1 & 6 \end{array}$$

d

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{4}{\cancel{5}} & \overset{1}{\cancel{6}} \\ - & 1 \quad 9 \\ \hline 3 & 7 \end{array}$$

e

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{6}{\cancel{7}} & \overset{1}{\cancel{7}} \\ - & 1 \quad 8 \\ \hline 5 & 9 \end{array}$$

f

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{3}{\cancel{4}} & \overset{1}{\cancel{8}} \\ - & 1 \quad 9 \\ \hline 2 & 9 \end{array}$$

g

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{4}{\cancel{5}} & \overset{1}{\cancel{6}} \\ - & 2 \quad 9 \\ \hline 2 & 7 \end{array}$$

h

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{5}{\cancel{6}} & \overset{1}{\cancel{2}} \\ - & 3 \quad 7 \\ \hline 2 & 5 \end{array}$$

i

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{6}{\cancel{7}} & \overset{1}{\cancel{0}} \\ - & 5 \quad 2 \\ \hline 1 & 8 \end{array}$$

j

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{4}{\cancel{5}} & \overset{1}{\cancel{5}} \\ - & 3 \quad 6 \\ \hline 1 & 9 \end{array}$$

k

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{4}{\cancel{5}} & \overset{1}{\cancel{1}} \\ - & 2 \quad 2 \\ \hline 2 & 9 \end{array}$$

l

$$\begin{array}{r|l} \text{T} & \text{O} \\ \hline \overset{7}{\cancel{8}} & \overset{1}{\cancel{0}} \\ - & 3 \quad 4 \\ \hline 4 & 6 \end{array}$$

- 2 How far is it from

- a** Port Gregory to Pitt Town?

35

- b** Camel Rocks to Stoneville?

49

- c** Which two towns are the closest together?
Show all your working.

Camel Rocks and Pitt Town.

Port Gregory	16
Camel Rocks	34
Pitt Town	51
Stoneville	83

Students' answers will vary.

3-digit addition and subtraction

1 Complete these addition algorithms. The first one has been done for you.

	H	T	O
	3	6	2
+	2	1	7
	5	7	9

	H	T	O
	7	1	2
+	1	6	4
	8	7	6

	H	T	O
	6	9	1
+	1	0	4
	7	9	5

	H	T	O
	5	5	4
+	3	2	4
	8	7	8

	H	T	O
	3	9	0
+	4	0	2
	7	9	2

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

	H	T	O
	8	5	5
+	1	1	4
	9	6	9

	H	T	O
	5	3	9
+	3	3	0
	8	6	9

	H	T	O
	7	0	0
+	2	9	6
	9	9	6

	H	T	O
	8	1	2
+	1	4	7
	9	5	9

2 Complete these subtraction algorithms. The first one has been done for you.

	H	T	O
	4	7	6
-	1	2	5
	3	5	1

	H	T	O
	3	4	9
-	2	1	6
	1	3	3

	H	T	O
	4	8	7
-	3	1	6
	1	7	1

	H	T	O
	5	5	2
-	1	5	1
	4	0	1

	H	T	O
	3	0	6
-	2	0	3
	1	0	3

3 Create two different addends for each sum.

	H	T	O
	1	3	2
+	2	2	5
	3	5	7

	H	T	O
	1	1	1
+	1	5	8
	2	6	9

	H	T	O
	2	3	2
+	2	3	2
	4	6	4

	H	T	O
	4	8	1
+	3	0	8
	7	8	9

	H	T	O
	1	0	4
+	1	5	6
	2	6	0

4 The answer is 135. Construct different subtraction number sentences to get this answer.

Students' answers will vary.

3-digit addition and subtraction with trading

- 1 Complete these addition algorithms with trading in the ones. The first one has been done for you.

$$\begin{array}{r} \text{a} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 2 & 3 & 5 \\ \hline \end{array} \\ + \begin{array}{|c|c|c|} \hline 3 & 4 & 8 \\ \hline \end{array} \\ \hline 5 \quad 8 \quad 3 \end{array}$$

$$\begin{array}{r} \text{b} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 3 & 4 & 7 \\ \hline \end{array} \\ + \begin{array}{|c|c|c|} \hline 2 & 1 & 6 \\ \hline \end{array} \\ \hline 5 \quad 6 \quad 3 \end{array}$$

$$\begin{array}{r} \text{c} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 6 & 0 & 9 \\ \hline \end{array} \\ + \begin{array}{|c|c|c|} \hline 3 & 5 & 7 \\ \hline \end{array} \\ \hline 9 \quad 6 \quad 6 \end{array}$$

$$\begin{array}{r} \text{d} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 2 & 7 & 6 \\ \hline \end{array} \\ + \begin{array}{|c|c|c|} \hline 6 & 1 & 6 \\ \hline \end{array} \\ \hline 8 \quad 9 \quad 2 \end{array}$$

$$\begin{array}{r} \text{e} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 3 & 3 & 7 \\ \hline \end{array} \\ + \begin{array}{|c|c|c|} \hline 5 & 4 & 3 \\ \hline \end{array} \\ \hline 8 \quad 8 \quad 0 \end{array}$$

- 2 Complete these subtraction algorithms with trading in the ones. The first one has been done for you.

$$\begin{array}{r} \text{a} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 4 & 7 & 4 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 2 & 1 & 8 \\ \hline \end{array} \\ \hline 2 \quad 5 \quad 6 \end{array}$$

$$\begin{array}{r} \text{b} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 5 & 6 & 7 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 1 & 2 & 9 \\ \hline \end{array} \\ \hline 4 \quad 3 \quad 8 \end{array}$$

$$\begin{array}{r} \text{c} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 3 & 8 & 2 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 1 & 3 & 5 \\ \hline \end{array} \\ \hline 2 \quad 4 \quad 7 \end{array}$$

$$\begin{array}{r} \text{d} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 4 & 7 & 1 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 2 & 5 & 6 \\ \hline \end{array} \\ \hline 2 \quad 1 \quad 5 \end{array}$$

$$\begin{array}{r} \text{e} \quad \begin{array}{|c|c|c|} \hline \text{H} & \text{T} & \text{O} \\ \hline 6 & 9 & 0 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 3 & 2 & 3 \\ \hline \end{array} \\ \hline 3 \quad 6 \quad 7 \end{array}$$

- 3 This table shows the height of some of the world's tallest buildings.

Building	Height (m)
Taipei 101 Tower	509
Petronas Towers	452
Sears Tower	442
Jin Mao Building	421
Bank of China Tower	369



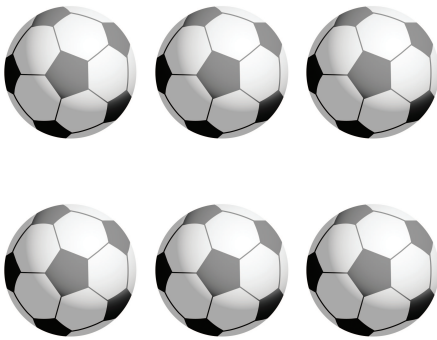
- a What is the total height of Taipei 101 Tower and Sears Tower? 951 m
- b What is the height difference between Petronas Towers and Jin Mao building? 31 m
- c Which 2 buildings have a total height of 790 m?
Jin Mao Building Bank of China Tower

Find out which country each tower is located in.

Multiplication and division using arrays

- 1 Make an array using eight counters. Can you make it another way? Show the different ways in the box below.

Students' answers will vary.



An array is a group of objects arranged in rows and columns.

For each array, you can write four different number sentences: two multiplication and two division.

$$\begin{array}{ll} 2 \times 3 = 6 & 6 \div 3 = 2 \\ 3 \times 2 = 6 & 6 \div 2 = 3 \end{array}$$

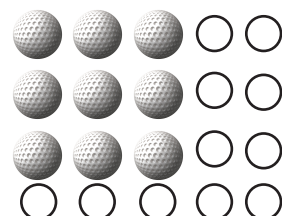
- 2 Write two multiplication and two division number sentences for each array.

Array	Number sentence
	$2 \times 5 = 10$
	$5 \times 2 = 10$
	$10 \div 5 = 2$
	$10 \div 2 = 5$
	$6 \times 4 = 24$
	$4 \times 6 = 24$
	$24 \div 6 = 4$
	$24 \div 4 = 6$

- 3 Match the pairs.

$$\begin{array}{ll} 8 \times 2 = 16 & 8 \div 4 = 2 \\ 4 \times 4 = 16 & 16 \div 2 = 8 \\ 2 \times 4 = 8 & 16 \div 4 = 4 \end{array}$$

- 4 Add more golf balls to the array to make this multiplication fact true: $4 \times 5 = 20$



Number and Place Value

MiB 2
Card
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Division from multiplication

- 1 Write two multiplication and two division number sentences for this array of chocolates in a box.



$$3 \times 4$$

$$12 \div 4$$

$$4 \times 3$$

$$12 \div 3$$

- 2 You need to fill a box with 24 chocolates. Draw all the possible arrays of chocolates below. Write the multiplication and related division number sentences for each array.

○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○

$$\begin{array}{ll} 24 \times 1 & 24 \div 1 \\ 1 \times 24 & 24 \div 24 \end{array}$$

○○○○○○○○○○○○○○○○○○
○○○○○○○○○○○○○○○○○○

$$\begin{array}{ll} 12 \times 12 & 24 \div 2 \\ 2 \times 12 & 24 \div 12 \end{array}$$

○○○○○○○○○○
○○○○○○○○○○
○○○○○○○○○○

$$\begin{array}{ll} 8 \times 3 & 24 \div 3 \\ 3 \times 8 & 24 \div 8 \end{array}$$

○○○○○○○○
○○○○○○○○
○○○○○○○○
○○○○○○○○

$$\begin{array}{ll} 6 \times 4 & 24 \div 4 \\ 4 \times 6 & 24 \div 6 \end{array}$$

Solve problems using arrays

1 Draw an array to help you solve these problems.

	Problem	Array	Number sentence and answer
a	There are 4 fish in each tank. How many fish are there in 3 tanks?		$4 \times 3 = 12$
b	There are 3 balls in each box. How many balls are there in 5 boxes?		$3 \times 5 = 15$
c	There are 16 sheep in 4 paddocks. How many sheep are there in each paddock?		$16 \div 4 = 4$
d	There 21 girls in 3 netball teams. How many girls are there in each team?		$21 \div 3 = 7$

2 a Write a word problem to match $2 \times 7 = 14$ _____

Students' answers will vary.

b Write a word problem to match $18 \div 6 = 3$ _____

Students' answers will vary.

3 Fill in the missing number or symbol for each related number sentence.

a $3 \times 7 = 21$, so $21 \div 7 = 3$ b $4 \times 6 = 24$, so $24 \div 6 = 4$

c $5 \times 5 = 25$, so $25 \div 5 = 5$ d $7 \div 1 = 7$, so $7 \div 1 = 7$,

e $8 \times 5 = 40$, so $40 \div 5 = 8$ f $10 \times 2 = 20$, so $20 \div 2 = 10$

4 Use the numerals 4, 9 and 36 to write four related multiplication

and division facts. $4 \times 9 = 36$, $9 \times 4 = 36$, $36 \div 4 = 9$,
 $36 \div 9 = 4$

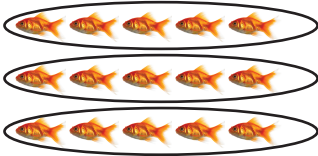
Use your calculator to make up some harder related number sentences.

e.g. $6 \times 15 = 90$ $90 \div 15 = 6$

The division sign

1 Use the arrays to solve these division questions. Circle each share.

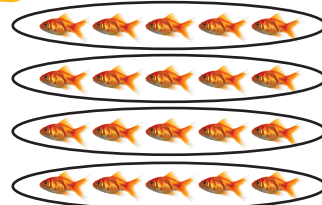
a Share into 3 groups. **b** Share into 2 groups. **c** Share into 4 groups.



$$15 \div 3 = \underline{5}$$



$$14 \div 2 = \underline{7}$$



$$\underline{20} \div \underline{4} = \underline{5}$$

2 Fill in the missing numbers.

a $12 \div 6 = 2$

$$\boxed{6} \overline{) 12}$$

Division facts can be written using $\overline{)}$
 $12 \div 3 = 4$ can be written $3 \overline{) 12}$

b $20 \div 5 = 4$

$$5 \overline{) \boxed{20}}$$

c $21 \div 3 = 7$

$$\boxed{3} \overline{) 21}$$

d $32 \div 4 = 8$

$$\boxed{4} \overline{) \boxed{32}}$$

e $45 \div 9 = 5$

$$9 \overline{) \boxed{45}}$$

3 Use the \div and $\overline{)}$ symbols to solve these zoo problems. Use counters or draw a diagram to help you.

	Problem	\div	$\overline{)}$
a	An elephant eats 18 carrots in 2 hours. How many carrots does the elephant eat in one hour?	$18 \div 2 = 9$	$2 \overline{) 18}$
b	There are 15 monkeys in 5 cages. How many monkeys are there in each cage?	$15 \div 3 = 5$	$3 \overline{) 15}$
c	At the giraffe enclosure, Louise counted 28 legs. How many giraffes are there?	$28 \div 4 = 7$	$4 \overline{) 28}$

Write the related multiplication fact for each of the above problems. The first one has been done for you.

a $2 \times 9 = 18$

b $3 \times 5 = 15$

c $4 \times 7 = 28$

4 Write down one division and one multiplication number fact that you can see on this number line.








Students' answers

will vary.

Multiplication and division problems

- 1** Is the problem to be solved with multiplication or division?
Work out the answer and record the strategy you used.
The first one has been done for you.

	Problem	Working out/strategy
	a A roller coaster has 8 carriages. If 4 people fit onto each carriage how many people can go on the ride at one time?	I know that $4 \times 4 = 16$ so, $8 \times 4 = \text{double } 4 \times 4$ $= 16 + 16$ $= 32$
	b A boat can hold 2 people. How many people in 9 boats?	$9 \times 2 = 18$
	c If it costs \$6 per ride, how many rides can you get for \$30?	$30 \div 6 = 5$
	d There are 6 clowns. If each clown has 8 balls, how many balls are there altogether?	$6 \times 8 = 48$
	e A car holds 3 people. If there are 24 people on the full ride, how many cars are there?	$24 \div 3 = 8$

- 2** Can you crack the code?

I	3	4	5	8	10	12	20	28	40	72
A	C	D	E	I	N	O	Q	R	U	V

a $8 \div 2 = 4$ **b** $8 \div 4 = 2$ **c** $72 \div 9 = 8$ **d** $16 \div 2 = 8$
e $6 \times 4 = 24$ **f** $5 \times 5 = 25$ **g** $7 \div 7 = 1$ **h** $60 \div 6 = 10$
i $20 \div 4 = 5$ **j** $18 \div 6 = 3$ **k** $12 \div 4 = 3$ **l** $10 \div 1 = 10$
m $2 \times 10 = 20$ **n** $5 \times 8 = 40$ **o** $7 \times 5 = 35$ **p** $4 \times 7 = 28$

a	b	c	d	e	f
D	I	V	I	D	E

g	h	i
A	N	D

j	k	l	m	n	o	p
C	O	N	Q	U	E	R

What does the message you decoded mean?

Solve problems

- 1 Choose 4 numbers between 0 and 9 and complete each multiplication square. Choose different numbers each time. The first one has been done for you.

4	6	24
3	5	15
12	30	

4	3	12
1	2	2
4	6	

9	1	9
3	5	15
27	5	

8	2	16
0	1	0
0	2	

- 2 Write and solve a word problem to suit each number sentence.

a 7×5 _____
 _____ 35

b $12 \div 2$ _____
 _____ 6

c 8×8 _____
 _____ 64

d $63 \div 9$ _____
 _____ 7

- 3 In the game of rugby league a try is worth 4 points, a goal 2 points and a field goal 1 point. Add the scores in the table below. Show your working.

Top Dogs			Cool Cats		
4 tries	6 goals	2 field goals	5 tries	3 goals	0 field goals
16	12	2	20	6	
$16 + 12 + 2 = 30$			$20 + 6 = 26$		

Who won? Top dogs

Show different ways to score 12 points in a game of rugby league.

Students' answers will vary.

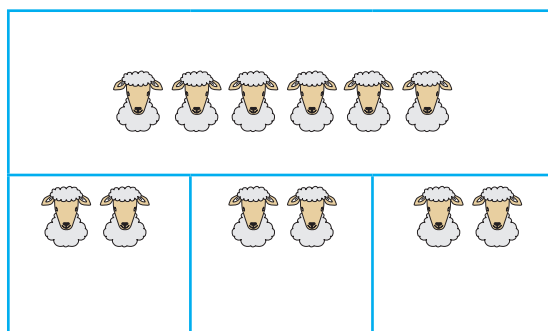
Division problems

- 1 There are 24 cows that need to be milked. Each day a different number of farmers will milk the cows. In the table below, write number sentences to show how many cows each farmer might milk each day.



	Day	Drawing	Number sentence
a	On Monday 3 farmers will milk the cows.		$24 \div 3 = 8$
b	On Tuesday 2 farmers will milk the cows.		$24 \div 2 = 12$
c	On Wednesday 6 farmers will milk the cows.		$24 \div 6 = 4$
d	On Thursday 4 farmers will milk the cows.		$24 \div 4 = 6$
e	On Friday only 1 farmer will milk the cows.		$24 \div 1 = 24$

- 2 a Place 12 sheep into the paddock so that each sheep has the same amount of space.



- b Place 18 pigs into the pen so that each pig has the same amount of space.



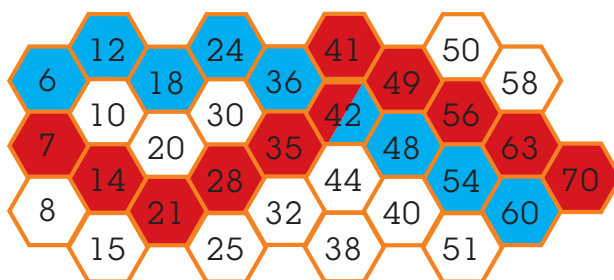
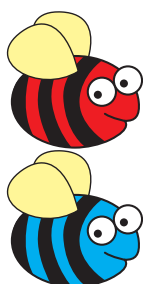
Find the multiples

- 1 Use counters to cover the first 10 multiples of 1. Look at the pattern. Now cover the first 10 multiples of 2. Look at the pattern. Continue this for the multiples of 3, 4, 5, 6, 7, 8 and 9.

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 Which multiples form a diagonal pattern? 3, 9
- b Which multiples form a horizontal pattern? 1
- c Which multiples form a vertical pattern? 2, 5

- 2 Help the bees walk across the hexagons by following a pathway. Use a blue pencil to mark the pathway for the multiples of 6 and a red pencil for the multiples of 7.



Which numbers did you colour twice? 42

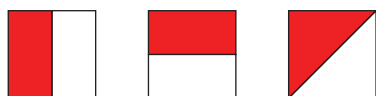
Explain why. multiple of both 6 and 7

Halves, quarters and eighths

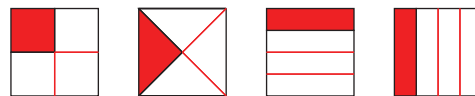
If you divide a shape into 2 equal parts, each part is called a **half**.
If you divide a shape into 4 equal parts, each part is called a **quarter**.
If you divide a shape into 8 equal parts, each part is called an **eighth**.

1

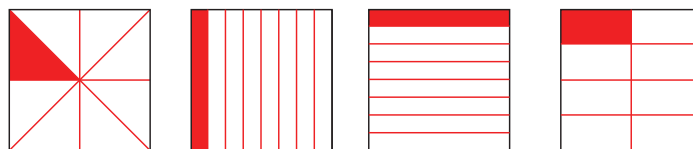
a Show different ways to cut these squares in half. Colour one half of each square.



b Show different ways to cut these squares in quarters. Colour one quarter of each square.

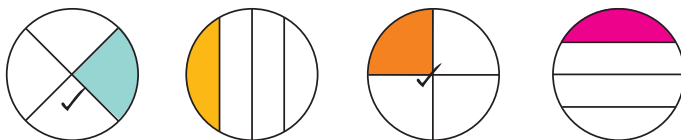


c Show different ways to cut these squares in eighths. Colour one eighth of each square.



2

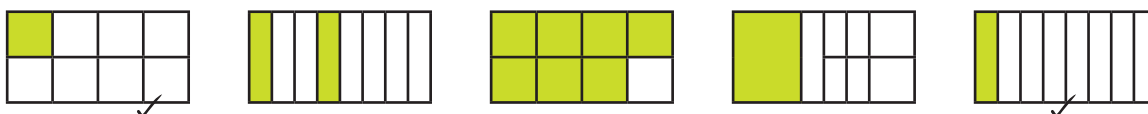
Tick the circles that show one-quarter shaded.



Discuss why $\frac{1}{8}$ is smaller than $\frac{1}{4}$ or $\frac{1}{2}$.

3

Circle the rectangles that show one-eighth shaded.



4

Draw a line to match the fraction to its name and picture.

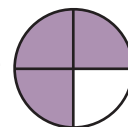
$\frac{1}{4}$
$\frac{1}{2}$
$\frac{5}{8}$
$\frac{3}{4}$

three-quarters

one-quarter

five-eighths

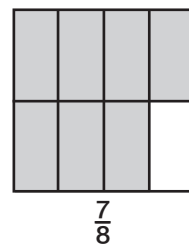
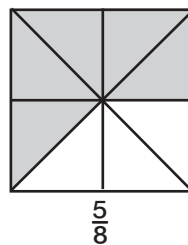
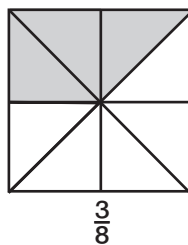
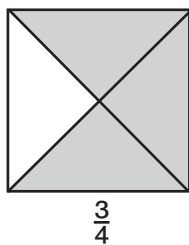
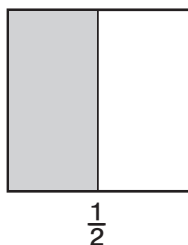
one-half



MIB 2
Card
52

More halves, quarters and eighths

1 Shade the fractions.



2 Order the fractions from smallest to largest in each row.

$\frac{2}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{4}{4}$	$\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ $\frac{4}{4}$
$\frac{1}{8}$	$\frac{4}{8}$	$\frac{3}{8}$	$\frac{2}{8}$	$\frac{1}{8}$ $\frac{2}{8}$ $\frac{3}{8}$ $\frac{4}{8}$
$\frac{2}{8}$	$\frac{7}{8}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{2}{8}$ $\frac{3}{8}$ $\frac{7}{8}$ $\frac{7}{8}$

If the bottom numbers of the fractions are the same, look at the top number to help you order them.

3 What fraction of this picture is:

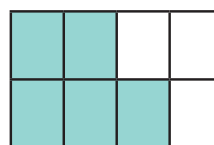
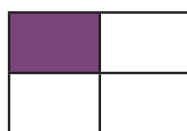
a blue? $\frac{5}{8}$

b yellow? $\frac{2}{8}$

c red? $\frac{1}{8}$



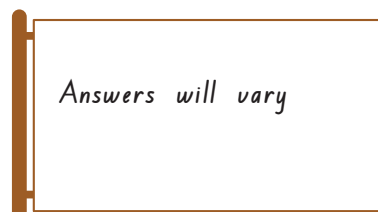
4



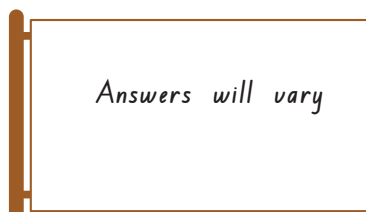
What fraction is shaded?	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{1}{2}$
What fraction is unshaded?	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

What did you notice? The two fractions equal a whole.

Divide this flag into quarters.
Design an interesting flag making
each quarter a different colour:

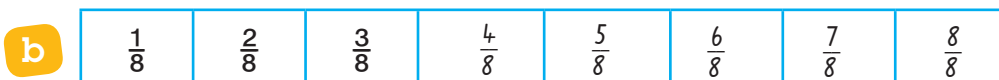
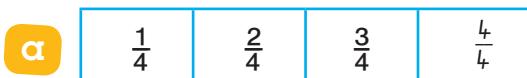


Divide this flag into eighths.
Colour $\frac{1}{2}$ of the flag blue, $\frac{1}{4}$ green,
 $\frac{1}{8}$ red and $\frac{1}{8}$ black.



Compare halves, quarters and eighths

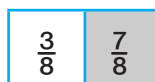
1 Continue each fraction number pattern.



2 Name a fraction between:

a $\frac{1}{4}$ and $\frac{3}{4}$ $\frac{2}{4}$ b $\frac{1}{8}$ and $\frac{3}{8}$ $\frac{2}{8}$ c $\frac{5}{8}$ and $\frac{7}{8}$ $\frac{6}{8}$

3 a Colour the larger in each pair.

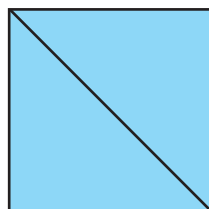


b Write 'greater than' or 'less than' to make each sentence correct.

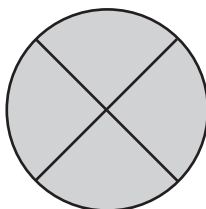
$\frac{3}{4}$ is greater than $\frac{5}{8}$. $\frac{3}{4}$ is greater than $\frac{1}{4}$.

$\frac{4}{8}$ is greater than $\frac{1}{8}$. $\frac{7}{8}$ is less than $\frac{8}{8}$.

4 Shade all parts of each diagram and write down the fraction it represents.



$$\frac{2}{2} = 1$$



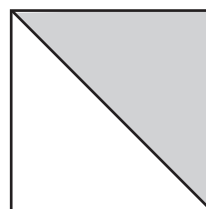
$$\frac{4}{4} = 1$$



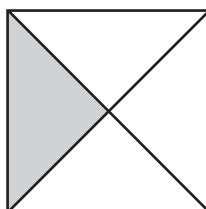
$$\frac{8}{8} = 1$$

If all parts are shaded, then the whole amount is represented.
2 parts out of 2 = $\frac{2}{2}$
= 1 whole.

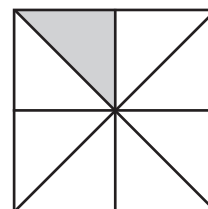
5 Shade one part of each diagram and write down the fraction it represents.



$$\frac{1}{2}$$

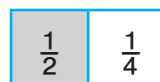


$$\frac{1}{4}$$



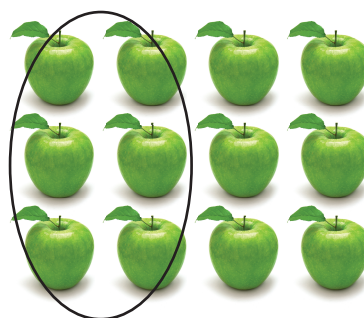
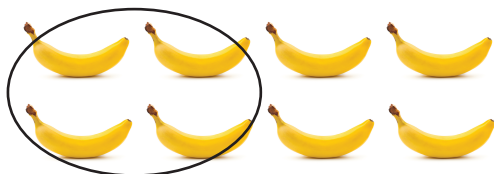
$$\frac{1}{8}$$

Look at the diagrams above and compare each fraction. Colour the larger in each pair.



Fractions of a collection

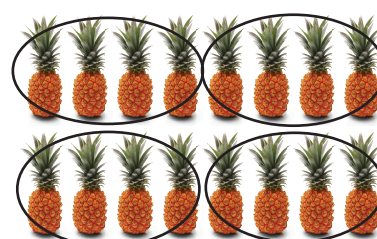
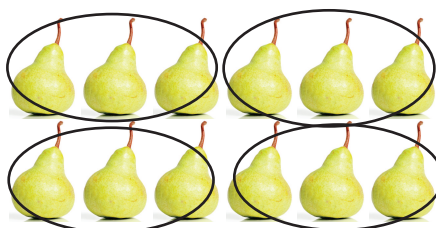
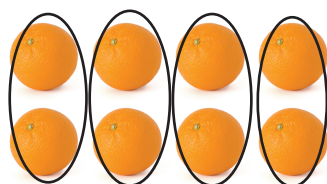
1 Circle half of these collections.



a Half of 8 = 4

b $\frac{1}{2}$ of 12 = 6

2 Draw circles to divide these collections into quarters.

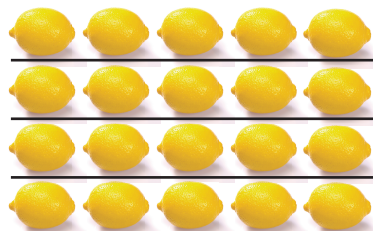


a One quarter of 8 = 2

b $\frac{1}{4}$ of 12 = 3

c $\frac{1}{4}$ of 16 = 4

3 Draw lines to divide each collection.



a $\frac{1}{2}$ of 14 = 7

b $\frac{1}{4}$ of 20 = 5

c $\frac{1}{8}$ of 16 = 2

4 Look at the picture of the eggs.
Can you find $\frac{1}{2}$ of 8? $\frac{1}{4}$ of 8? $\frac{1}{8}$ of 8?
Show your findings in the box.



4, 2, 1



Look at the picture of the dozen eggs in the carton.
How many eggs in one dozen?
What is $\frac{1}{2}$ of a dozen?
What is $\frac{1}{4}$ of a dozen?
What is $\frac{3}{4}$ of a dozen?



Thirds

If you divide a shape into 3 equal parts, each part is called a third.

- 1 Show different ways to cut these shapes into thirds.

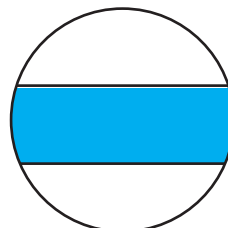
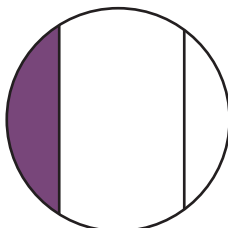
a



b



- 2 Tick the circles that show one-third shaded.



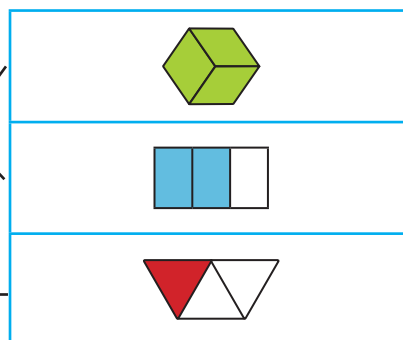
- 3 Draw a line to match the fraction to its name and picture.

$\frac{1}{3}$	
$\frac{2}{3}$	
$\frac{3}{3}$	

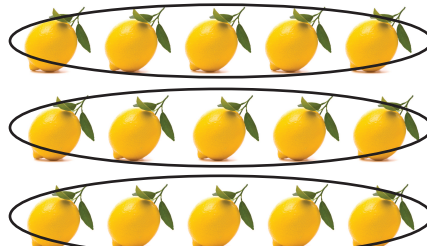
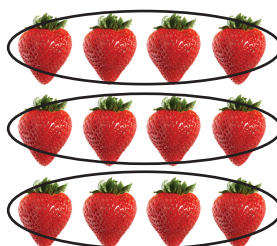
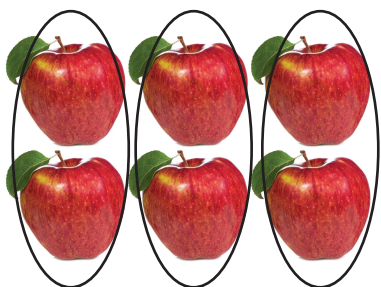
two-thirds

one whole

one-third



- 4 Draw circles to divide these collections into thirds.

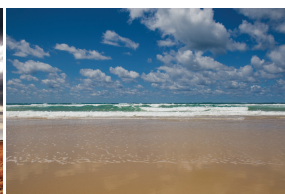


a One-third of 6 = 2

b $\frac{1}{3}$ of 12 = 4

c $\frac{1}{3}$ of 15 = 5

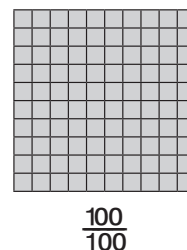
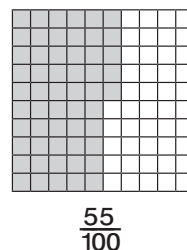
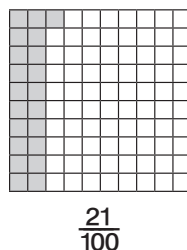
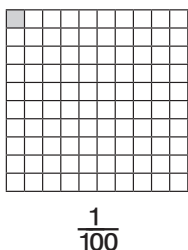
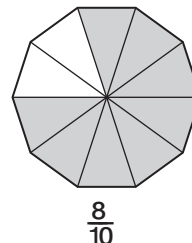
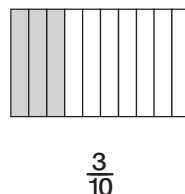
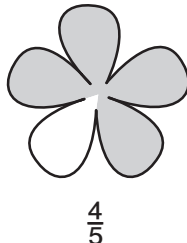
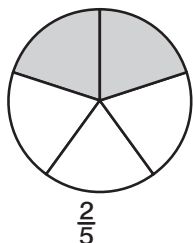
The rule of thirds: When taking a photograph, the horizon should sit at the horizontal line dividing the lower one-third of the photo from the upper two-thirds. Circle the photos of Australian landscapes in which the photographer has followed the rule of thirds.



Fifths, tenths and hundredths

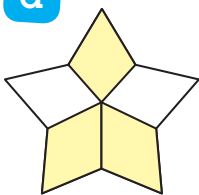
If you divide a shape into 5 equal parts, each part is called one fifth ($\frac{1}{5}$).
 If you divide a shape into 10 equal parts, each part is called one tenth ($\frac{1}{10}$).
 If you divide a shape into 100 equal parts, each part is called one hundredth ($\frac{1}{100}$).

1 Shade the fractions.



2 Which fraction is shaded?

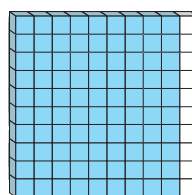
a



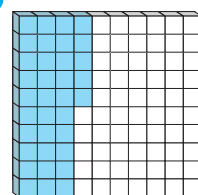
b



c



d



Write what fraction would need to be shaded for the whole shape to be shaded. a $\frac{2}{5}$ b $\frac{6}{10}$ c $\frac{10}{100}$ d $\frac{65}{100}$

3 Order the fractions from smallest to largest in each row.

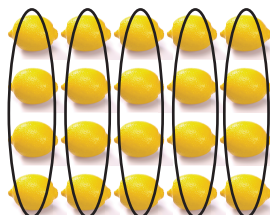
$\frac{2}{5}$	$\frac{4}{5}$	$\frac{1}{5}$	$\frac{3}{5}$	$\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$
$\frac{1}{10}$	$\frac{6}{10}$	$\frac{10}{10}$	$\frac{8}{10}$	$\frac{1}{10}$ $\frac{6}{10}$ $\frac{8}{10}$ $\frac{10}{10}$
$\frac{14}{100}$	$\frac{4}{100}$	$\frac{1}{100}$	$\frac{41}{100}$	$\frac{1}{100}$ $\frac{4}{100}$ $\frac{14}{100}$ $\frac{41}{100}$

4 Circle one-fifth of these collections.

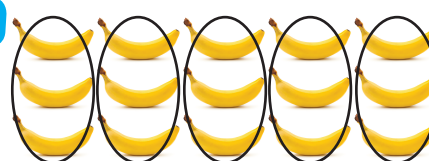
a



b



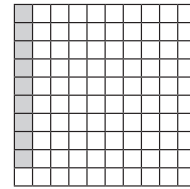
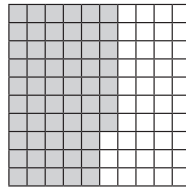
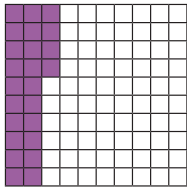
c



Hundredths as a decimal

- 1 Shade each hundredths square. Record the shaded fraction in decimal form. The first one has been done for you.

Hundredths can be expressed in decimal form. 15 hundredths or $\frac{15}{100}$ can be written as 0.15.



- a 24 hundredths b 57 hundredths c 9 hundredths

0.24 0.57 0.09

- 2 What fraction of each diagram in Question 1 is unshaded? Write your answer in decimal form.

- a 0.76 b 0.43 c 0.91

- 3 How many hundredths does each decimal represent?

- a $0.67 = \underline{67}$ hundredths b $0.13 = \underline{13}$ hundredths
c $0.40 = \underline{40}$ hundredths d $0.04 = \underline{4}$ hundredths

- 4 What is the place value of the coloured numeral?

- a 0.34 tenths b 0.81 hundredths
c 0.92 hundredths d 0.51 tenths
e 0.46 ones f 0.06 tenths

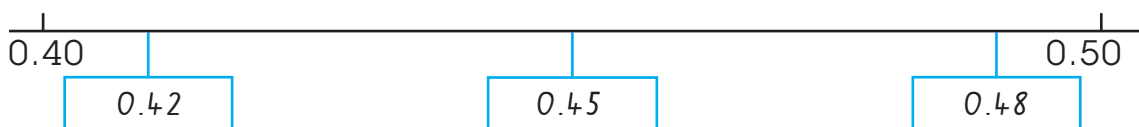
ones	•	tenths	hundredths
0	•	2	5

In the decimal 0.25, the place value of the 2 is tenths and the 5 is hundredths.

- 5 Write 'greater than' or 'less than' to make each sentence correct.

- a 0.74 is greater than 0.72 b 0.65 is less than 0.95
c 0.06 is less than 0.60 d 0.70 is greater than 0.67

- 6 Write 3 decimals on the number line.

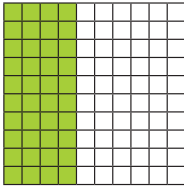


Decimals and money

- 1 Show the following amounts on each hundredths square and write the amount in decimal form. The first one has been done for you.

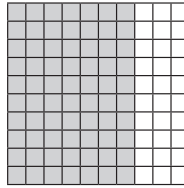
There are 100 cents in one dollar. $\$1 = 100\text{c}$
 30 cents = $\frac{30}{100}$ of a dollar = 30 hundredths of a dollar = $\$0.30$

a 40 cents



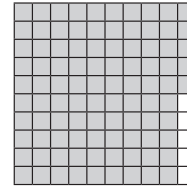
\$ 0.40

b 70 cents



\$0.70

c 95c



\$0.95

This is 1 dollar and 25 cents. That's 125 cents or $\$1\frac{25}{100}$ or $\$1.25$

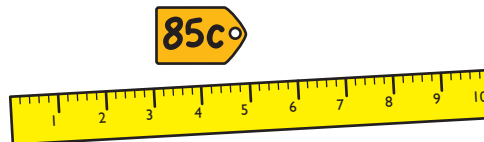
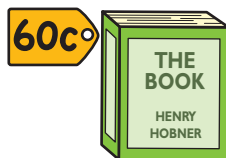
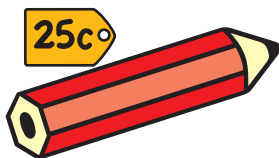


- 2 Complete these tables showing the amounts in dollars and cents and in decimal form.

Cents	Fraction of \$1	Decimal form
20c	$\frac{20}{100}$	\$0.20
60c	$\frac{60}{100}$	\$0.60
75c	$\frac{75}{100}$	\$0.75
15¢	$\frac{15}{100}$	\$0.15
5¢	$\frac{5}{100}$	\$0.05

Cents	Decimal form
140c	\$1.40
260c	\$2.60
375¢	\$3.75
550c	\$5.50
995¢	\$9.95

3








Write the value of each in decimal form. The first one has been done for you.

pencil \$0.25 book \$0.60 ruler \$0.85 glue stick \$1.75

Change please

Down Under Tucker at Ripper Prices

				
Vegemite toast	lamington	meat pie	pavlova	BBQ prawns
\$1.45	\$2.50	\$3.75	\$6.00	\$8.95



1 Calculate how much change you would get from \$5 if you bought

a a lamington. \$2.50

b a meat pie. \$1.25

2 Calculate how much change you would get from \$10 if you bought

a Vegemite toast. \$8.55

b BBQ prawns. \$1.05

3 Use a calculator to find the total cost of buying all 5 items. \$22.65

How much change would you get from \$50? \$27.35



4 Calculate the cost of each meal at Ketut's if you get the following change from \$20. Write your answers under each menu item.

a \$4.05 change for chicken satay

b \$8.65 change for gado gado

c \$13.25 change for nasi goreng

Ketut's Indonesian Takeaway



chicken satay	gado gado	nasi goreng
\$15.95	\$11.35	\$6.75

5 Siobhan bought a squid curry, spring rolls and fish cakes at Yum Tum's Thai. She paid \$30 and got \$1.25 change. Show how much she might have paid for each item.

Yum Tum's Thai



squid curry	spring rolls	fish cakes
\$11.45	\$6.55	\$10.75

Use the internet to find out which two metals the Australian five-cent coin is made from.

Calculations using money

1 Bus fares are calculated by the number of sections you travel.

a Rona likes to catch the bus around the city. How much would it cost her to travel:

5 sections? \$3.00

8 sections? \$4.00

20 sections? \$5.80

Bus fare	Child
3 to 5 sections	\$3.00
6 to 9 sections	\$4.00
10 to 15 sections	\$4.80
16 + sections	\$5.80

b How many cents is \$1.80? 180

c How many cents is \$3.00? 300

d How much change would Rona get from \$5 if she travels:

i 9 sections? \$1 ii 15 sections? \$0.20 iii 1 section? \$4.10

e It costs Rona \$1.80 to travel 2 sections. How much more does it cost her to travel 3 sections? Show how you worked mentally. \$1.20

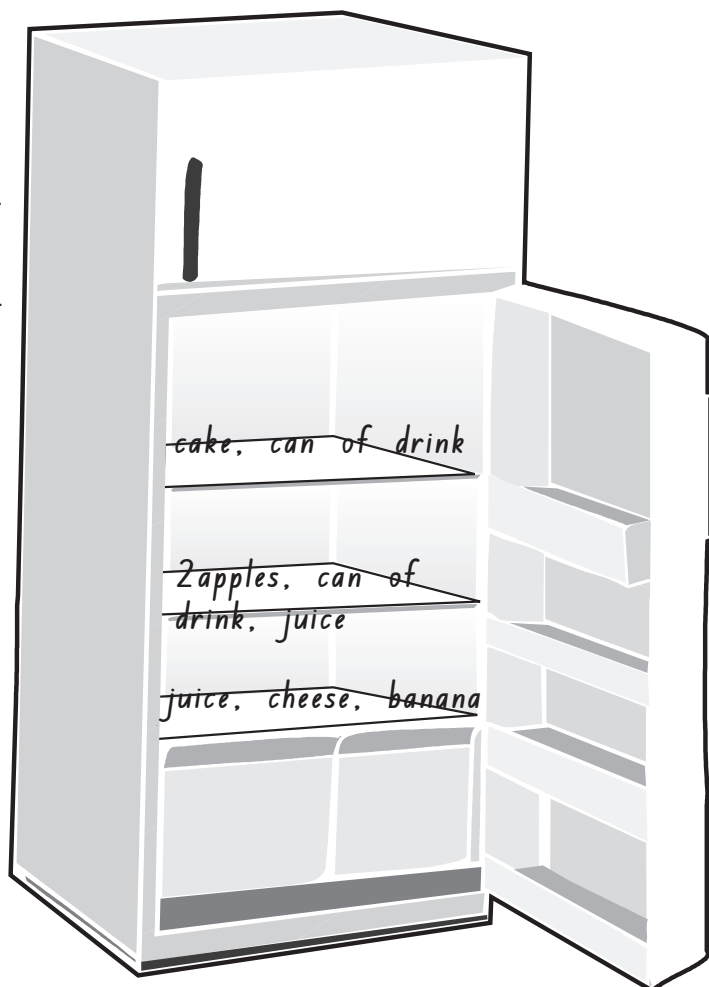
2 Help fill the fridge.

a On the top shelf draw items that total \$2.00.

b On the middle shelf draw items that total \$4.50.

c On the bottom shelf draw 3 items that total \$10.00.

Item	Cost
apple	\$0.30
banana	\$0.50
can of drink	\$0.90
cake	\$1.10
sauce	\$1.20
pineapple	\$1.80
juice	\$3.00
cheese	\$6.50



Shopping

1 Look at the prices on the list of groceries and answer the questions.

- a Which item is the cheapest? lemon
- b Which item is the most expensive? broccoli
- c What is the difference in price between the cheapest and most expensive item? \$2.50



Item	Cost each
apple (green)	\$0.75
apple (red)	\$0.60
banana	\$0.70
bread	\$1.50
broccoli	\$2.85
capsicum	\$1.10
eggs	\$2.55
juice	\$2.75
lemon	\$0.35
milk	\$1.90
pasta	\$2.00
water	\$1.20

2 Matt and Yanni bought a bag of groceries each. Find the total cost of the groceries you can see in each bag. Show all your working. Use a calculator to help you.

bread = \$1.50
 banana = \$2.10 (\$0.70 = 3)
 eggs = \$2.55
 milk = \$1.90
 capsicum = \$1.10
 broccoli = \$2.85
 pasta = \$2.00

bread = \$1.50
 pasta = \$2.00
 juice = \$2.75
 water = \$1.20
 apple(green) = \$0.75
 apple(red) = \$0.60
 lemon = \$0.35
 banana = \$2.10 (\$0.70 × 3)

Matt \$ 14.00 Yanni \$ 11.25

Whose groceries cost more? Matt

3 The total of both bags is \$ 25.25.
How much change would they get from \$50 if they paid together?

\$24.75

Make up a problem of your own using the shopping list. Ask a friend to solve it.

Money relationships

- 1 Convert from dollars and cents to cents and vice versa.

	dollars and cents	cents
a	\$3.75	375
b	\$8.05	805
c	\$7.65	765c

	dollars and cents	cents
d	\$9.30	930c
e	\$6.05	605c
f	\$15.50	1550c

- 2 Complete the table by counting the money and writing the amount in each column. The first one has been done for you.

Not all countries of the world use dollars and cents. Many countries use different denominations and divisions to that of Australia.

					
dollars and cents	\$5.00	\$3.85	\$5.60	\$26	\$80
cents	500c	385	560	2600	8000

- 3 The Japanese yen (¥) is the official currency of Japan. In Japan, coins and notes have the following values.

coins ¥1, ¥5, ¥10, ¥50, ¥100, ¥500

banknotes ¥1000, ¥2000, ¥5000, ¥10 000



- a How many ¥100 coins are needed to make ¥1000? 10
- b How many ¥500 coins are needed to make ¥1000? 2
- c How many ¥5 coins are needed to make ¥1000? 200

- 4 The Indonesian rupiah (Rp) is the official currency of Indonesia. How many Rp5000 notes are needed to buy



- a a pineapple juice for Rp10 000? 2
- b a banana pancake for Rp20 000? 4
- c fried noodles for Rp35 000? 7