

Looking at whole numbers – read and write numbers to 999 999

We read and write numbers in the order that we say them.

Thousands	Hundreds	Tens	Units
6	7	1	5

 └──┬──┬──┬──┘
six thousand seven hundred and fifteen

1 Express the following in numerals:

- a four thousand three hundred and sixty two _____
- b three hundred and twenty four _____
- c eight thousand nine hundred and three _____
- d four thousand eight hundred and forty one _____
- e seven hundred and three _____
- f five thousand four hundred and two _____

2 Write the following in words:

- a 5 816 _____
- b 915 _____
- c 8 466 _____
- d 254 _____
- e 7 615 _____
- f 2 598 _____

3 Match the numerals with the words:

- 4 639 six thousand seven hundred and ninety
- 2 709 one thousand and three
- 8 341 four thousand six hundred and thirty nine
- 1 003 two thousand seven hundred and nine
- 6 790 eight thousand three hundred and forty one

Looking at whole numbers – order numbers to 999 999

When ordering numbers, we need to pay close attention to the position and value of each digit.

Which is the largest? 6 093 3 069 3 960 6 039

1 Circle the larger number:

a 8 434 / 8 340

b 5 492 / 5 692

c 17 015 / 17 150

d 9 840 / 8 999

e 4 815 / 4 518

f 25 194 / 25 941

g 768 / 7 068

h 87 158 / 87 155

2 Insert > (greater than) or < (less than) to make each statement true.

a 6 482 6 681

b 9 452 9 360

c 84 945 85 105

d 1 999 2 009

e 1 469 1 649

f 75 136 73 156

g 94 054 91 504

h 7 819 7 815

3 Arrange the following numbers in *ascending* order:

46 827, 468 457, 115 468, 250 015, 98 652, 12 698

_____, _____, _____, _____, _____, _____

4 Arrange the following numbers in *descending* order:

36 817, 408 453, 115 468, 252 013, 89 632, 12 898

_____, _____, _____, _____, _____, _____

Looking at whole numbers – order numbers to 999 999

5 Look at each set of numbers and list some that come in between. Write them in order.

a 23 560

37 682

b 123 691

223 691

c 110 420

80 682

6 Write a number that is:

a More than 5 678

b Close to 56 018

c A little less than 78 931

d Almost double 4 000

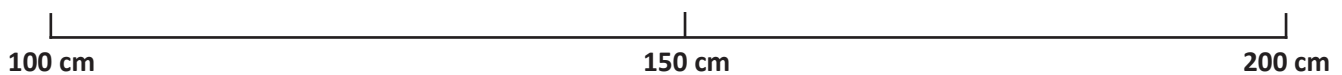
e Between 34 612 and 38 901

f Less than half of 88 000

g Now write 2 more problems for a friend to answer:

7 Here are the heights of 5 students. Place them on the number line. Find your height and that of two friends and add these to the number line.

Sarah	174 cm
Huy	152 cm
Jack	148 cm
Emma	167 cm
Nikita	121 cm



Looking at whole numbers – create and compare numbers

- 4 This table shows the population of 10 regional centres.
Use the information to answer the following questions:

Name	Population 1996	Population 2001
Rainsalot	92 273	98 981
Funkytown	59 936	68 715
Point Lonely	24 945	45 299
Dullsville	15 906	24 640
Nirvana	67 701	68 443
Dodgy Meadows	270 324	279 975
Braggersville	125 382	130 194
Letsgo	15 906	11 368
Notsoniceton	42 848	44 451
Mt Hero	21 751	20 525



- a The population of the mystery place in 2001 is less than it was in 1996. It has decreased by approximately 1 000 people. The place is _____.
- b You have gone back in time to 1997. You live in a city that has a population of more than 55 000 but less than 60 000. You live in _____.
- c It is now 2001. You have decided to move to a larger centre. This centre has a 4 in the units place and a zero in the thousands place. You move to _____.
- d In 2001 you decided to go on a holiday. You only visited centres that had a population of between 40 000 and 99 000. Which towns did you visit?

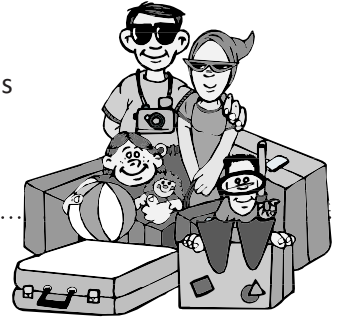
- e Many regional centres showed growth between 1996 and 2001. List the ones that grew by more than 5 000 residents.

- f Your family moved here in 1996 and since then, the population has nearly doubled. Where did you move to?



Getting ready

Your family has just won the dream trip of a lifetime! You have won an all expenses paid trip to 5 towns or cities of your choice. That's right, anywhere in the world with everything paid for.



What to do

Your job is to plan the trip, following these guidelines:

- 1 Your dad hates big cities so one place must have a population of 10 000 or less.
- 2 Your mum wants to shop. Big time.
- 3 Your gran has always wanted to see New York.
- 4 You get to choose the other two places.

Record your selections in the left column of the table below:

Place	Population



What to do next

Use an atlas or the internet to help you research the population of your 5 towns or cities, then use the information to answer the following:

- a Order your towns from smallest population to largest:

- b Choose two of your destinations and write their populations in words:

- c Find a way to divide your places into two numerical categories such as odd/even, smaller than 100 000/greater than 100 000. Get a friend to see if they can work out the rule that you have applied.

Place value of whole numbers – expanded notation

When we write numbers using expanded notation, we identify and name the value of each digit.

$$4\,231 = 4\,000 + 200 + 30 + 1$$

1 Express the numbers in expanded notation:

a 8 246

b 468

c 761

d 1 645

e 971

f 7 385

g 1 978

2 Express the expanded notation in numerals:

a $600 + 80 + 7 =$

b $3\,000 + 700 + 40 + 5 =$

c $800 + 30 + 4 =$

d $200 + 60 + 9 =$

e $2\,000 + 800 + 40 + 6 =$

f $7\,000 + 900 + 20 + 5 =$

g $200 + 40 + 5 =$

h $9\,000 + 800 + 30 + 2 =$

3 Answer the following questions.

a Tim says 4 329 in expanded notation is written as $4\,000 + 3\,000 + 29$. Is he correct? _____

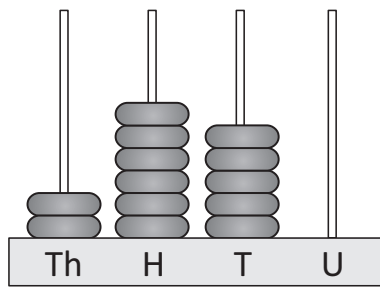
b Now he says that 5 847 is written as $5\,000 + 800 + 40 + 7$. Is he correct this time? _____

c Look carefully at the number 8 953. Why don't we expand it as $8 + 9 + 5 + 3$?

d What is the point of a zero in the middle of 7 049? It has no value so why not just leave it out?

Place value of whole numbers – place value to 4 digits

The place or position of a digit in a number helps us understand its value.



2 650

2 is worth 2 000 or two thousands

6 is worth 600 or six hundreds

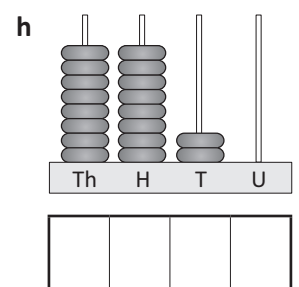
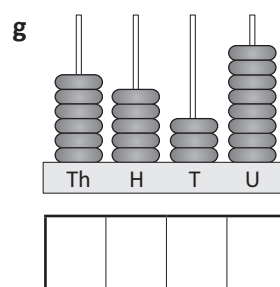
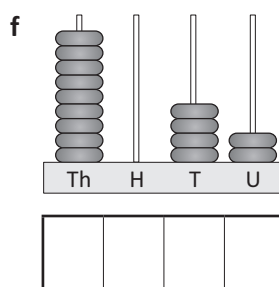
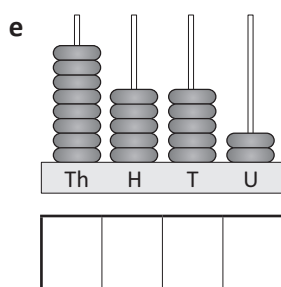
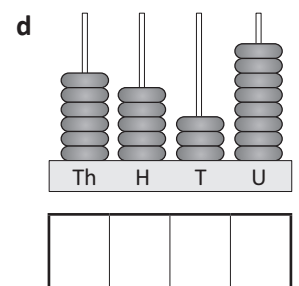
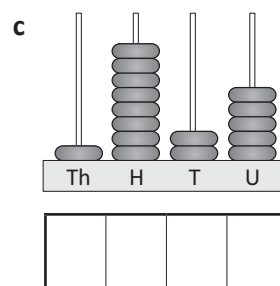
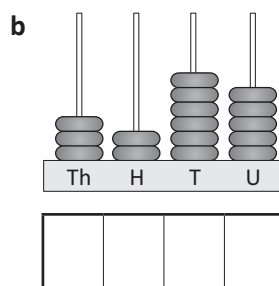
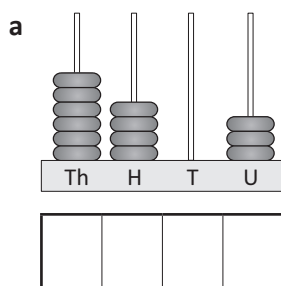
5 is worth 50 or five tens

0 is worth zero or no units

1 Fill in the place value chart for each number. The first one has been done for you.

	Thousands	Hundreds	Tens	Units
a	465	4	6	5
b	8 972			
c	45			
d	798			
e	4 507			
f	3 041			

2 Write the number shown on each abacus.



Place value of whole numbers – place value to 4 digits

3 What is the value of the 5 in these numbers?

a 6 157

b 9 544

c 5 749

d 4 546

e 785

f 2 359

4 Write the next 3 numbers in each sequence. The first sequence has been done for you.

a + 100

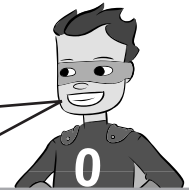
b + 1

c + 1 000

d - 100

Zero plays an important role in numbers. It tells us that the value of the column is nothing and holds the place of the other numbers.

I have \$6 055. Without the zero I only have \$655!



5 Complete the cross number puzzle. Make sure you include the zeros in the right places.

1			2		3
		4		5	
	6		7		
	8				
					9
10					

Across

- four thousand two hundred and seven
- seven thousand and ninety four
- two thousand five hundred and sixty
- one thousand and forty seven
- nine thousand and forty three

Down

- four thousand and eighty six
- seven hundred
- two hundred and four
- seven thousand and fifty
- nine thousand two hundred and seven
- two thousand one hundred and thirty
- six thousand four hundred and three
- sixty

Place value of whole numbers – place value to 6 digits

Look at the number **123 456**.

- 1 is worth 100 000 or one hundred thousand •
- 2 is worth 20 000 or two ten thousands •
- 3 is worth 3 000 or three thousands •
- 4 is worth 400 or four hundreds •
- 5 is worth 50 or five tens •
- 6 is worth 6 or six units •

When we write large numbers we put a space after every three numbers. This is because our brains prefer small chunks of information. We chunk from right to left: 2 568 023.

1 Write the number shown in each row of this place value chart. The first one has been done for you.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
45 168		4	5	1	6	8
			5	4	9	4
	7	1	8	9	5	4
		4	6	5	1	2
		2	5	7	7	4
			8	1	9	1
			3	0	4	1

2 Identify the value of the digit in bold. The first one has been done for you.

- | | | | | | |
|-----------|--|----------|--|-----------|--|
| a 549 157 | <input style="width: 100px; height: 30px;" type="text" value="9 000"/> | b 9 544 | <input style="width: 100px; height: 30px;" type="text"/> | c 85 749 | <input style="width: 100px; height: 30px;" type="text"/> |
| d 467 849 | <input style="width: 100px; height: 30px;" type="text"/> | e 12 468 | <input style="width: 100px; height: 30px;" type="text"/> | f 4 688 | <input style="width: 100px; height: 30px;" type="text"/> |
| g 134 | <input style="width: 100px; height: 30px;" type="text"/> | h 94 115 | <input style="width: 100px; height: 30px;" type="text"/> | i 994 913 | <input style="width: 100px; height: 30px;" type="text"/> |

3 True or False?

- a In the number 567 923, the 7 has the value of 7 000. _____
- b In the number 899 471, the 8 has the value of 80 000. _____
- c In the number 705 532, the zero holds the value of the ten thousands place. _____

Place value of whole numbers – place value to 6 digits

4 Use the clues to find the mystery numbers:

I have 5 digits.

Every digit is an odd number and every digit in the number is different.

The greatest digit is in the units place and the smallest digit is in the ten thousands place.

Both the thousands digit and the tens digit are greater than the hundreds digit.

So far, I could be 2 numbers. I am the greater of these.

I am _____

I have 6 digits.

If you add one unit to me I have 7 digits.

What number am I?

I am _____

A useful strategy is to make lines where each digit should go and fill them in as you work them out.



REMEMBER

I am one half of a million plus one.

What number am I?

I am _____

I have 5 digits.

I have a 6 in the ten thousands place and my digit in the unit place is the smallest even number.

My middle digit is one more than the units digit.

My thousands digit is double my units digit and my tens digit is double my thousands digit.

What number am I?

I am _____

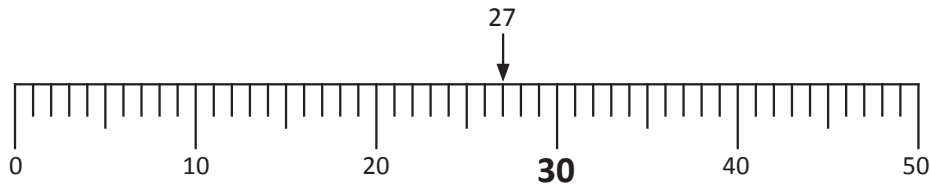
Write a problem for a friend to solve:

Round and estimate – round to a power of 10

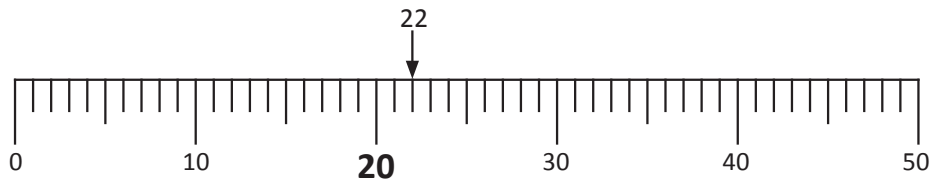
Rounding makes big numbers easier to work with. We round up if the number is exactly halfway between the 10s or over the halfway mark. We round down if the number is under the halfway mark.

Rounding to the nearest 10

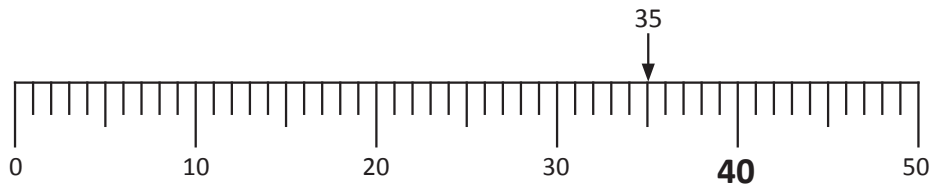
27 is over halfway between the 10s, so it rounds up to 30.



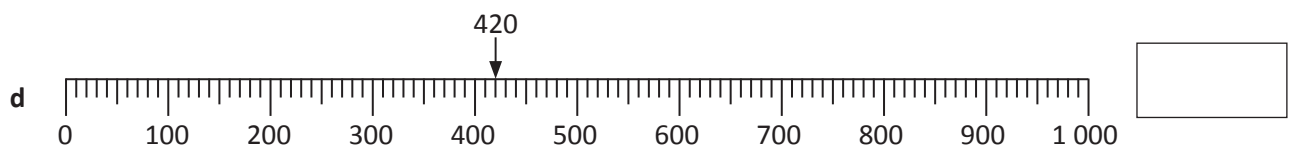
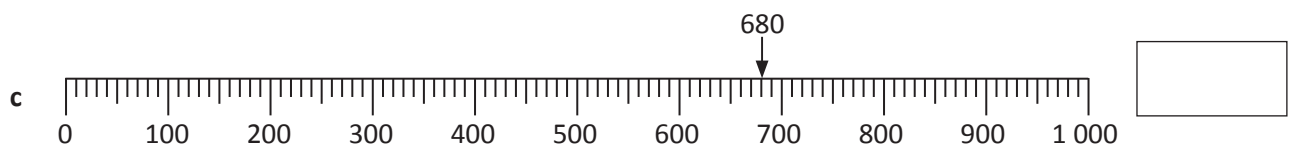
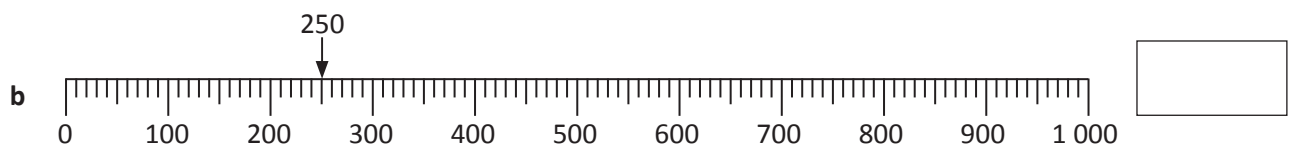
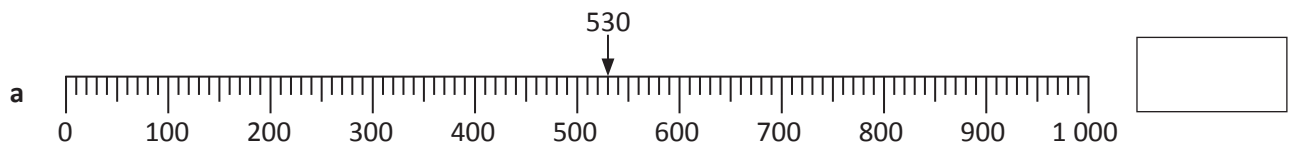
22 is under halfway between the 10s, so it rounds down to 20.



35 is exactly halfway between the 10s, so it rounds up to 40.



1 Round the following numbers to the closest hundred. Find the halfway mark first.



Round and estimate – round to a power of 10

2 Round the following numbers to the closest hundred:

- | | | | |
|---------|----------------------|---------|----------------------|
| a 235 | <input type="text"/> | b 680 | <input type="text"/> |
| c 513 | <input type="text"/> | d 450 | <input type="text"/> |
| e 5 164 | <input type="text"/> | f 3 748 | <input type="text"/> |

Use the number in the tens place to help you decide!



3 Round the following numbers to the closest thousand:

- | | | | |
|---------|----------------------|---------|----------------------|
| a 942 | <input type="text"/> | b 4 964 | <input type="text"/> |
| c 2 435 | <input type="text"/> | d 9 350 | <input type="text"/> |
| e 5 678 | <input type="text"/> | f 2 845 | <input type="text"/> |

Use the number in the hundreds place to help you decide!



4 To find the hidden fact, round the numbers in the clues below and insert the matching letters above the answers. The first clue has been done for you.

<u>30</u>	<u>10</u>	<u>400</u>	<u>40 000</u>	<u>20</u>	<u>40</u>	<u>1 000</u>	<u>10</u>	<u>100</u>	<u>400</u>
		<u>70</u>	<u>80</u>	<u>100</u>	<u>7 000</u>	<u>100</u>	<u>80</u>		
<u>500</u>	<u>200</u>	<u>40</u>	<u>50</u>	<u>900</u>	<u>80</u>	<u>100</u>	<u>1 100</u>	<u>1 000</u>	<u>10</u>
		<u>30 000</u>	<u>900</u>	<u>20</u>	<u>50</u>	<u>1 000</u>	<u>400</u>		

- | | |
|--|---|
| S 368 rounded to the nearest hundred | Q 43 230 rounded to the nearest ten thousand |
| T 1 234 rounded to the nearest thousand | P 69 rounded to the nearest ten |
| M 27 rounded to the nearest ten | N 1 146 rounded to the nearest hundred |
| C 483 rounded to the nearest hundred | R 83 rounded to the nearest ten |
| I 43 rounded to the nearest ten | F 6 726 rounded to the nearest thousand |
| D 932 rounded to the nearest hundred | H 199 rounded to the nearest hundred |
| O 7 rounded to the nearest ten | L 46 rounded to the nearest ten |
| E 59 rounded to the nearest hundred | A 27 468 rounded to the nearest ten thousand |
| U 17 rounded to the nearest ten | |

Round and estimate – estimate

We use estimating when we want an approximate answer to a calculation.

Rounding helps us do this. We round numbers so we can work with them more easily in our heads.

Look at $333 + 521$.

Rounded to the nearest 10, they are 330 and 520.

$330 + 520 = 850$

Therefore $333 + 521$ is approximately 850.

1 Complete these steps to see why estimating is handy.

a Use the problem $57 - 38 = \square$. Time how long it takes you or a friend to solve it mentally.

b Now round the numbers to the nearest ten and time how long it takes to solve this problem.

c Which problem is faster to solve? _____

d Can you think of an occasion you would use estimation? _____

2 Practise estimating with these problems. You can use the middle column to jot down your rounded number sentences or just do them in your head. If you want to add some tension to the activity, race against a partner.

Sentence	Rounded Sentence	Answer
$384 + 53$		
$22 + 69$		
$406 - 89$		
$379 + 203$		
$93 - 61$		
$609 - 498$		
$826 + 599$		
$221 + 11$		
$704 + 341$		
$47 + 996$		

Compare your answers with those of others. Did you all get the same answers? Why or why not?



Round and estimate – estimate

3 Round then estimate to find the best answer to these calculations. Circle the best answer:

a	$72 - 48 =$	30	20	27
b	$57 + 31 =$	90	15	30
c	$126 - 37 =$	90	100	30
d	$567 - 23 =$	500	550	600
e	$899 + 47 =$	850	950	900
f	$1\ 215 + 134 =$	1\ 400	1\ 300	1\ 000
g	$6\ 454 + 207 =$	6\ 000	8\ 000	6\ 700

Which one is best?



4 Use estimation to assess whether these statements might be true. Tick the ones you think are true and cross the ones you think are false.

- | | | | | | |
|---|----------------------|--------------------------|---|-------------------------|--------------------------|
| a | $568 + 311 > 1\ 000$ | <input type="checkbox"/> | b | $27 + 58 > 70$ | <input type="checkbox"/> |
| c | $899 - 378 < 600$ | <input type="checkbox"/> | d | $571 - 22 > 500$ | <input type="checkbox"/> |
| e | $245 + 245 > 500$ | <input type="checkbox"/> | f | $1\ 005 + 790 > 2\ 000$ | <input type="checkbox"/> |

5 Use estimation to answer these word problems:

a Sarah is saving money to go to the fair. In week 1 she saves \$13, in week 2 she saves \$19 and in week 3 she saves \$29. Estimate how much money she has at the end of week 3.

b The show bags that Sarah wants cost roughly \$15 each. If she wants to spend half her money on show bags, how many show bags can she buy?

c For lunch, Sarah wants a hot dog, hot chips and 3 jam donuts (mmm... healthy). She has budgeted \$10 for lunch. Look at the price list below and estimate whether she can buy what she wants and stay within her budget.

Menu	Price
Pie/pastie	\$2.50
Sausage roll	\$2.00
Hot dog	\$3.80
Jam donuts	3 for \$2.00
Hot chips	\$3.00
Hamburger	\$6.50

Round and estimate – calculations

When estimating, we always need to check that our answers are **reasonable**.

$\$23 + \$59 = \$1\ 000$. Is this estimation reasonable?

1 Are these estimations reasonable? Explain your thinking.

- a Nicola wants a digital camera that costs \$486 and a memory stick that costs \$46. She estimates she will spend approximately \$1 000 on both. Is this estimation reasonable?
- b Shakeb says $91 + 33$ is close to 120. Is this estimation sensible?
- c Kylie is crazy about dolphins. She has 4 889 pictures of them, 389 stuffed toys, and 481 figurines. She thinks she has about 6 000 items altogether. Is this estimation reasonable?
- d Sean made a list of the money he had spent on lunch over the week. He then estimated that he had spent \$30 over the week. Is this a reasonable estimate?

Mon	\$4.50	Tues	\$5.65	Wed	\$3.85	Thurs	\$6.25	Fri	\$7.70
-----	--------	------	--------	-----	--------	-------	--------	-----	--------

2 In these problems, work backwards from an estimated answer to find the possible starting points.

- a Daniel bought 3 chocolate bars. He estimated the bars to cost \$2, \$3 and \$1.50. This would make the total estimated cost \$6.50. The **actual** cost was \$6.75. What could each of the chocolate bars have cost?
- _____
- b Hung bought 3 books. He estimated their costs to be \$5, \$9 and \$15. This would make the total estimated cost \$29. The **actual** cost was \$33. What could each of the books have cost? Find two possibilities.
- _____



What is the difference between the estimation and the actual cost? How could you share that cost difference between the items?

Round and estimate – calculations

When we use a calculator, it is tempting to rely on it and to stop thinking. Estimating helps us develop an idea of what the possible answer should be. If we make an error with the calculator, we then know to try again.

- 3 Estimate the answer to these problems. Get a friend to sign off on your estimations, then use a calculator to solve the problems.

	Estimate	Calculation
a 23×5	<input type="text"/>	<input type="text"/>
b 47×6	<input type="text"/>	<input type="text"/>
c 33×8	<input type="text"/>	<input type="text"/>
d 11×19	<input type="text"/>	<input type="text"/>
e 97×3	<input type="text"/>	<input type="text"/>
f 201×4	<input type="text"/>	<input type="text"/>
g 498×3	<input type="text"/>	<input type="text"/>

Signed

Breathe in... breathe out... breathe in... breathe out...

- 4 How many breaths do you take in a day? Not exactly, an estimation will do. You'll need a clock with a second hand. You may also want to use a calculator. Ask a partner to help you keep track of how many breaths you take in a minute, then multiply as necessary.

- a Use this table to help you organise your calculations.

Time Frame	Number of Breaths
per minute	<input type="text"/>
per hour	<input type="text"/>
per day	<input type="text"/>

- b Can you take it further? How many breaths could you take in a week?

- c What about in a year?

How many minutes in an hour? How many hours in a day?

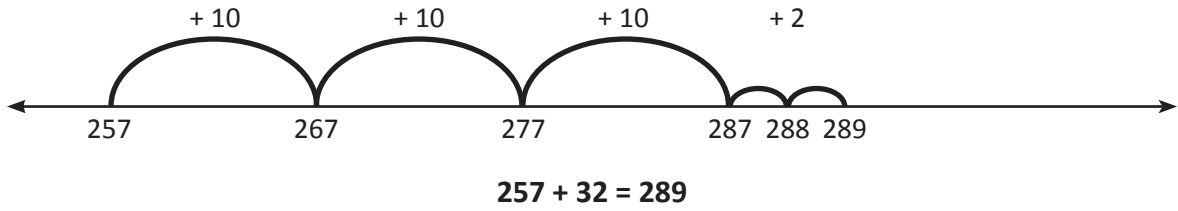


THINK

Addition mental strategies – jump strategy

When we add we can use the jump strategy to help us. Look at $257 + 32$:

- 1 First we jump up by the tens
- 2 Then we jump up by the units

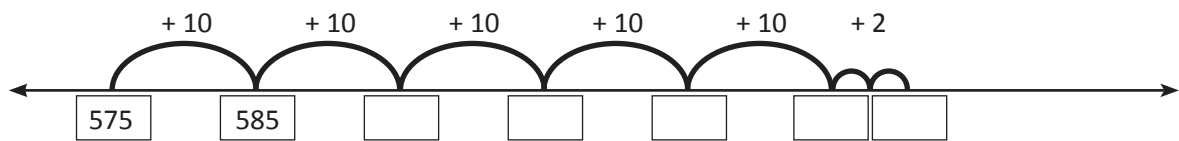


- 1 Warm up with jumping by tens up and down these ladders:

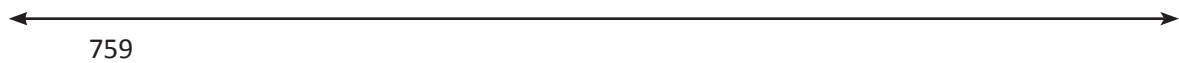


- 2 Use the jump strategy to complete these additions:

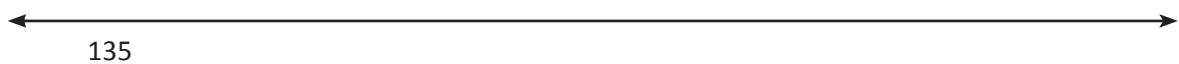
a $575 + 52 = \square$



b $759 + 41 = \square$



c $135 + 73 = \square$



Addition mental strategies – split strategy

138 can be split into 100, 30 and 8.

When adding large numbers in our heads it can be easier to split one of the numbers into parts and add each part separately.

$$214 + 138 \begin{cases} 100 \\ 30 \\ 8 \end{cases} \rightarrow 214 + 100 = 314 \rightarrow 314 + 30 = 344 \rightarrow 344 + 8 = 352$$

$$214 + 138 = 352$$



1 Use the split strategy to add the numbers. The first one has been done for you.

a $623 + 28 \begin{cases} 20 \\ 8 \end{cases}$

$$623 + 20 = 643$$

$$643 + 8 = 651$$

$$623 + 28 = 651$$

b $38 + 26 \begin{cases} \square \\ \square \end{cases}$

$$\underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}}$$

$$38 + 26 = \square$$

c $156 + 142 \begin{cases} \square \\ \square \\ \square \end{cases}$

$$\underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}}$$

$$156 + 142 = \square$$

2 These problems have been split and some have been solved already. Lucky, hey? You just have to work out what the second numbers were before they were split and answer any unsolved problems:

a $416 + 90 + 1 = 507$

was

$$416 + \underline{91}$$

b $230 + 30 + 3 = \square$

was

$$230 + \underline{\hspace{2cm}}$$

c $283 + 60 + 7 = \square$

was

$$283 + \underline{\hspace{2cm}}$$

d $532 + 60 + 1 = \square$

was

$$532 + \underline{\hspace{2cm}}$$

e $425 + 100 + 40 + 2 = \square$

was

$$425 + \underline{\hspace{2cm}}$$

f $129 + 200 + 40 + 6 = \square$

was

$$129 + \underline{\hspace{2cm}}$$

3 Work out the answers to these questions by using the split strategy. See if you can do the working in your head. If it helps, make notes as you go:

a $173 + 36 = \square$

b $446 + 51 = \square$

c $112 + 83 = \square$

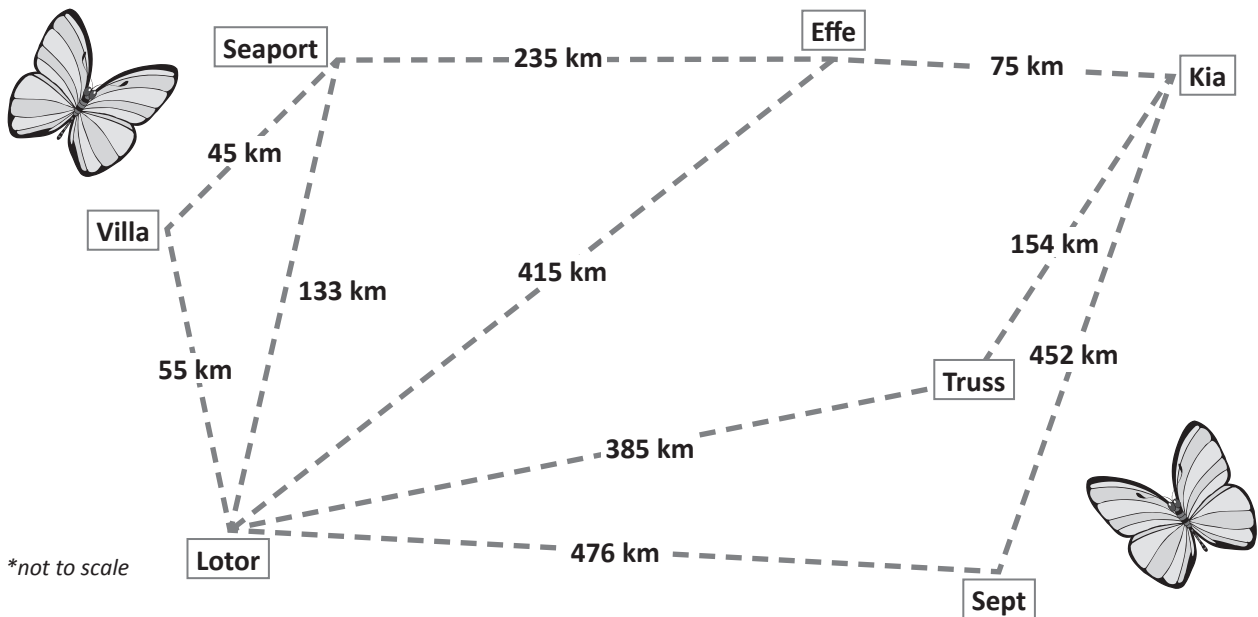
d $724 + 72 = \square$

e $475 + 122 = \square$

f $123 + 164 = \square$

Addition mental strategies – split strategy

- 4 Butterflies can fly great distances. Use the map and the split strategy to calculate the total distance flown by each butterfly in the table below:



Flight Path	Distances to add	Total distance
The Field Crescent flies from Lotor to Villa and then to Seaport	55 + 45	
The Painted Lady flies from Sept to Lotor and then to Villa		
The Fawn flies from Seaport to Effe and then to Kia		
The Monarch flies from Sept to Kia and then to Effe		

We often use the split strategy when adding money. We split the amounts into dollars and cents, work out each part and then add the two answers together:

$$\begin{aligned}
 \$28.50 + \$16.80 &= (\$28 + \$16) + (\$0.50 + \$0.80) \\
 &= \$44 + \$1.30 \\
 &= \$45.30
 \end{aligned}$$

- 5 Match the price tags with the bills:

$\$18.25 + \12.75

Total: \$31

$\$64.70 + \11.30

Total: \$46

Total: \$76

$\$11.85 + \34.15

Total: \$130

$\$56.35 + \73.65

Addition mental strategies – compensation strategy

Sometimes we round one number in the problem to make it easier to do in our heads. Then we adjust our answer to compensate:

$$405 + 69 = \boxed{474}$$

$$405 + 70 \text{ (} -1 \text{)} \quad \textit{I rounded up by 1}$$

$$475 \text{ (} -1 \text{)} = 474 \quad \textit{so I subtract 1.}$$

I added 1 extra to round to 70 so I have to take 1 off my answer.



THINK

1 Warm up by rounding these numbers to the closest ten:

- a 48 _____ b 67 _____ c 232 _____ d 74 _____
 e 89 _____ f 456 _____ g 955 _____ h 786 _____

2 Solve these problems using compensation:

a $45 + 37 = \boxed{}$

$45 + 40 \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

b $66 + 18 = \boxed{}$

$66 + \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

c $86 + 49 = \boxed{}$

$86 + \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

d $124 + 57 = \boxed{}$

$124 + \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

We can also round down to the closest ten. When we do this we add to compensate.

3 Round these numbers to the closest ten. Then compensate by adding:

a $26 + 42 = \boxed{}$

$26 + 40 \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

b $35 + 63 = \boxed{}$

$35 + \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

c $96 + 21 = \boxed{}$

$96 + \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

d $145 + 34 = \boxed{}$

$145 + \text{ (} \text{)}$
 $ \text{ (} \text{)} = $

Addition mental strategies – compensation strategy

4 Connect the statements with their answer:

When we round down we compensate by

subtracting

When we round up we compensate by

adding

5 Solve these addition problems using compensation. Decide if you need to round up or down and compensate accordingly. Make as many notes as you need to:

a $425 + 67$

b $673 + 98$

c $275 + 91$

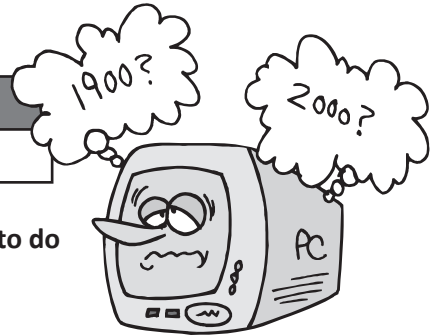
d $784 + 32$

e $316 + 73$

f $115 + 79$

6 A website tracked the number of visitors over 5 days:

Monday	Tuesday	Wednesday	Thursday	Friday
124	199	213	158	236



Use the compensation method to answer the following questions. Try to do the sum in your head, then show how you did it in the space below:

- How many people looked at the website on Monday and Tuesday?
- How many people looked at the website on Thursday and Friday?
- On which 2 days did the total reach 449 visitors?



Getting ready

Work out the answers to these sums in your head. Each answer matches a letter in the list on the right. Write the letters next to your answers, then unjumble the letters to find the name of a city.



What to do

Try competing with a friend to be the fastest to do all of the sums and work out the names of the three cities.

- a** $701 + 126 =$ Letter _____
- $501 + 81 =$ Letter _____
- $810 + 117 =$ Letter _____
- $304 + 205 =$ Letter _____
- $810 + 17 =$ Letter _____
- $230 + 626 =$ Letter _____

The city is _____

- b** $293 + 216 =$ Letter _____
- $811 + 111 =$ Letter _____
- $650 + 130 =$ Letter _____
- $610 + 57 =$ Letter _____
- $380 + 32 =$ Letter _____

The city is _____

- c** $816 + 40 =$ Letter _____
- $913 + 62 =$ Letter _____
- $751 + 105 =$ Letter _____
- $830 + 79 =$ Letter _____
- $882 + 93 =$ Letter _____
- $471 + 111 =$ Letter _____

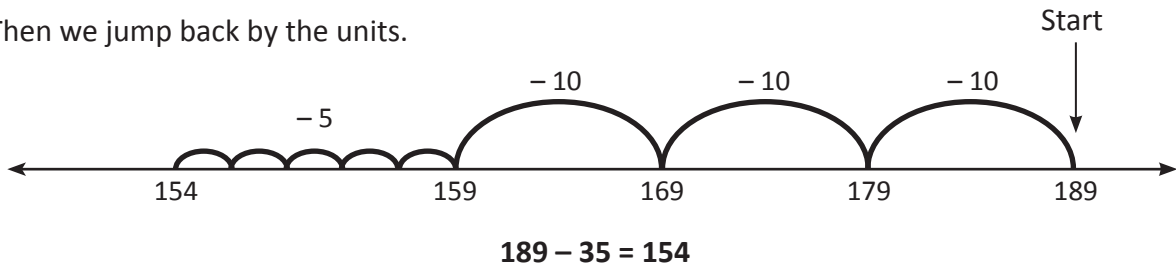
The city is _____

Code
A = 922
B = 754
C = 141
D = 582
E = 927
F = 735
G = 222
H = 358
I = 780
J = 989
K = 481
L = 909
M = 398
N = 856
O = 975
P = 667
Q = 555
R = 412
S = 509
T = 538
U = 656
V = 1110
W = 1150
X = 716
Y = 827
Z = 1907

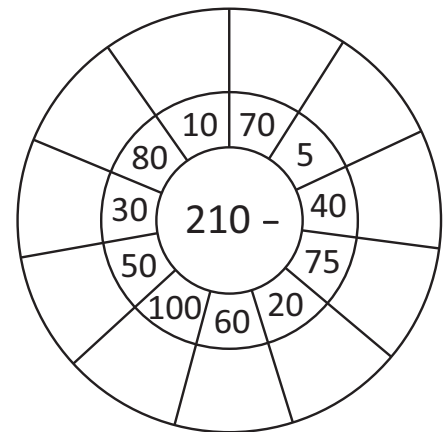
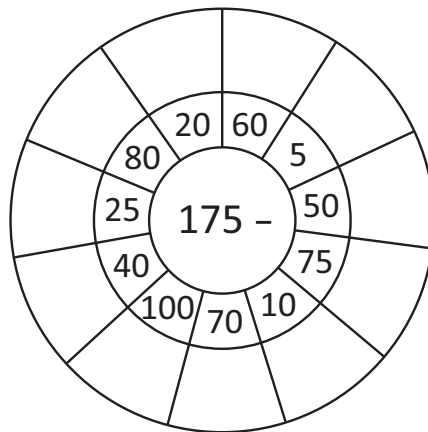
Subtraction mental strategies – jump strategy

When we subtract we can use the jump strategy to help us. Look at $189 - 35$:

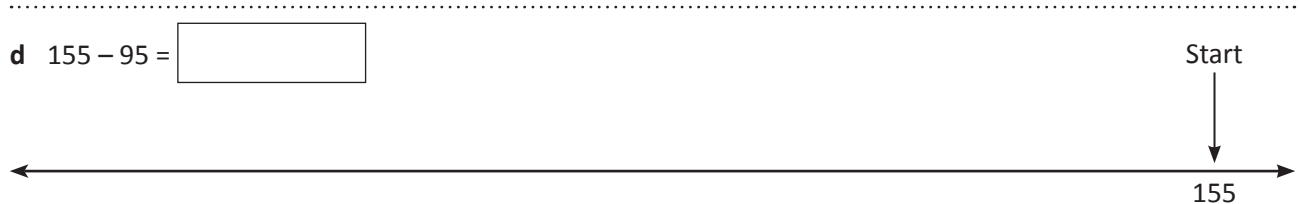
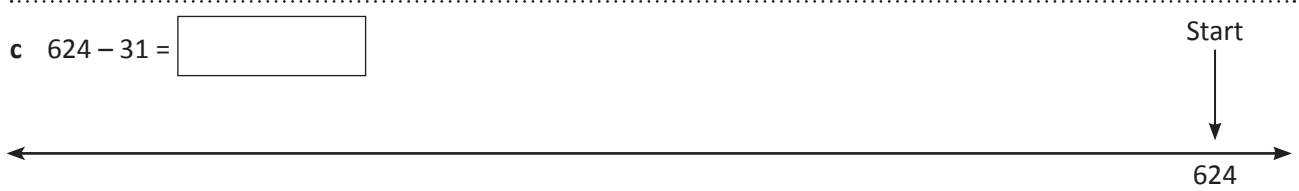
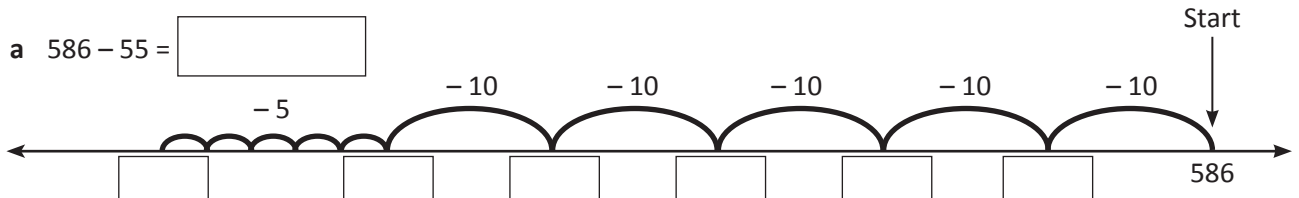
- 1 First we jump back by the tens.
- 2 Then we jump back by the units.



- 1 Warm up with these subtraction wheels:



- 2 Use the jump strategy to complete these subtraction problems. The first one has been started for you:



Subtraction mental strategies – jump strategy

3 Work out the answers to these by using the jump strategy. See if you can do the working in your head:

a $274 - 30 =$

b $872 - 61 =$

c $444 - 50 =$

d $784 - 61 =$

e $189 - 35 =$

f $825 - 60 =$

4 An electronics store had a sale on the following video games. Use the jump strategy to work out the savings on each item:

Bionic Bozo	Revenge of the Ponies	Fitness Frenzy	Taekwondo Team
Was \$105	Was \$135	Was \$102	Was \$155
Now \$75	Now \$60	Now \$91	Now \$111
Save	Save	Save	Save



5 Use the prices above and the jump strategy to solve these problems. Show your answer and any working out:

- a Tahlia saved her pocket money for weeks to buy Fitness Frenzy. She had \$120 saved and bought Fitness Frenzy in the sale. How much money did she have left after the purchase?
- b Martin saved up especially for the sale and bought 2 items for \$186. He bought Bionic Bozo and which other game?
- c Dana bought Taekwondo Team for her husband before the sale. What change did she receive if she paid with 2 \$100 notes?

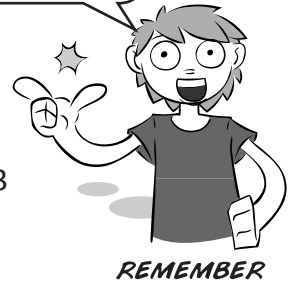
Subtraction mental strategies – split strategy

Remember that
215 is 200 + 10 + 5

When subtracting large numbers in our heads it can be easier to split the number to be subtracted into parts and work with each part separately.

$$468 - 215 \begin{cases} 200 \\ 10 \\ 5 \end{cases} \rightarrow 468 - 200 = 268 \rightarrow 268 - 10 = 258 \rightarrow 258 - 5 = 253$$

$$468 - 215 = 253$$



1 Practise splitting these numbers into hundreds, tens and units. The first one is done for you.

- a $356 = 300 + 50 + 6$ b $289 = \underline{\hspace{2cm}}$ c $867 = \underline{\hspace{2cm}}$
 d $923 = \underline{\hspace{2cm}}$ e $442 = \underline{\hspace{2cm}}$ f $294 = \underline{\hspace{2cm}}$

2 Use the split strategy to subtract:

<p>a $468 - 316$ </p> <p>$468 - 300 = \underline{\hspace{2cm}}$</p> <p>$\underline{\hspace{2cm}} - 10 = \underline{\hspace{2cm}}$</p> <p>$\underline{\hspace{2cm}} - 6 = \underline{\hspace{2cm}}$</p> <p>$468 - 316 = \underline{\hspace{2cm}}$</p>	<p>b $574 - 155$ </p> <p>$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$</p> <p>$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$</p> <p>$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$</p> <p>$574 - 155 = \underline{\hspace{2cm}}$</p>	<p>c $457 - 323$ </p> <p>$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$</p> <p>$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$</p> <p>$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$</p> <p>$457 - 323 = \underline{\hspace{2cm}}$</p>
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3 Work out the answers to these questions then cross out the letter above each answer in the puzzle. The letters that remain will form the answer to the riddle.

- | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|
| a $484 - 74 = \boxed{\hspace{2cm}}$ | b $400 - 80 = \boxed{\hspace{2cm}}$ | c $406 - 106 = \boxed{\hspace{2cm}}$ |
| d $410 - 40 = \boxed{\hspace{2cm}}$ | e $403 - 13 = \boxed{\hspace{2cm}}$ | f $455 - 60 = \boxed{\hspace{2cm}}$ |
| g $497 - 92 = \boxed{\hspace{2cm}}$ | h $505 - 25 = \boxed{\hspace{2cm}}$ | i $520 - 25 = \boxed{\hspace{2cm}}$ |
| j $795 - 150 = \boxed{\hspace{2cm}}$ | k $410 - 100 = \boxed{\hspace{2cm}}$ | |

S	Y	H	O	U	E	R	X	E	L	A
300	195	410	305	150	320	505	370	595	405	200

K	Z	R	I	D	R	J	U	M	V	A
390	495	220	395	210	385	480	500	205	645	310

Riddle: What is the most rhythmic part of your body?

Subtraction mental strategies – split strategy

4 These problems have been completed. Are they correct? If not, circle where it all began to go wrong:

a $375 - 164$

100
60
4

$375 - 100 = 275$

$275 - 60 = 215$

$215 - 4 = 211$

$375 - 164 = 211$

b $429 - 143$

100
40
3

$429 - 100 = 323$

$323 - 4 = 319$

$319 - 3 = 316$

$429 - 143 = 316$

c $179 - 158$

100
50
8

$179 - 100 = 79$





$79 - 50 = 39$

$39 - 8 = 31$

$179 - 158 = 31$

5 The following problems require you to add and subtract. Use the split strategy to help you solve them:

Four different families went on a holiday over Easter. Work out the distance that each car has travelled on the missing days:

	 Robertsons	 Pankhursts	 Cailes	 Darnleys
Day 1	125 km	225 km		130 km
Day 2	375 km		525 km	
Day 3		110 km	125 km	270 km
Total distance	735 km	836 km	950 km	695 km

Make as many notes as you need to help you:

6 Assuming that each family started their holiday from the same place, work out where each family was at the end of Day 2. Connect the place with the family by drawing a line:

Family	Place
Robertsons	Damp 'n Crazy Water Park – 726 km
Darnleys	The Big Baboon – 825 km
Pankhursts	Insect Museum – 425 km
Cailes	The Giant Toothbrush – 500 km

Subtraction mental strategies – compensation strategy

Sometimes we round one number in the problem to make it easier to do in our heads. Then we adjust our answer to compensate:

$$486 - 59 = \boxed{427}$$

$$486 - 60 (+1) \quad \text{I rounded up by 1, which means I subtracted}$$

$$426 (+1) = 427 \quad \text{1 extra so we need to add 1 back.}$$

I took off 1 extra so I have to add 1 back.



THINK

1 Round these numbers to the closest ten. Then compensate by subtracting or adding to get back to the first number. The first one is done for you.

a $93 = 90 + 3$

b $48 = \underline{\hspace{2cm}}$

c $52 = \underline{\hspace{2cm}}$

d $76 = \underline{\hspace{2cm}}$

e $57 = \underline{\hspace{2cm}}$

f $37 = \underline{\hspace{2cm}}$

g $27 = \underline{\hspace{2cm}}$

h $68 = \underline{\hspace{2cm}}$

2 Solve these subtraction problems using compensation. Show all your working out:

a $585 - 78 = \boxed{\hspace{2cm}}$

b $894 - 71 = \boxed{\hspace{2cm}}$

c $163 - 149 = \boxed{\hspace{2cm}}$

$585 - 80 (+2)$

$894 - 70 (-1)$

$163 - 150 (+1)$

$\underline{\hspace{2cm}} \bigcirc = \underline{\hspace{2cm}}$

$\underline{\hspace{2cm}} \bigcirc = \underline{\hspace{2cm}}$

$\underline{\hspace{2cm}} \bigcirc = \underline{\hspace{2cm}}$

3 Solve these problems using compensation. Decide if you need to round up or down and compensate accordingly:

a $555 - 63$

b $775 - 98$

c $644 - 139$

d $594 - 329$

e $432 - 204$



You can solve these in your head or make notes as you go. Do whatever works for you.

REMEMBER

Written methods – addition

	H	T	U
	12	13	5
+	4	8	9
	7	2	4

How do we add using a written strategy?

First we estimate: $235 + 500 = 735$. Our answer will be around 735.

We start with the units. $5 + 9$ is 14 units. We rename this as 1 ten and 4 units.

We put the 4 in the units column and carry the 1 to the tens column.

3 tens plus 8 tens plus the carried ten is 12 tens.

We rename this as 1 hundred and 2 tens

We put the 2 in the tens column and carry the 1 to the hundreds column.

We add the hundreds. We put 7 in the hundreds column.

Finally we check against our estimate – do they match?

1 Solve these addition problems. First estimate the answers:

e:

	H	T	U
	5	4	1
+	3	1	3

e:

	H	T	U
	1	7	3
+	5	9	2

e:

	H	T	U
	3	8	4
+	2	1	3

e:

	H	T	U
	2	6	8
+	4	9	3

e:

	Th	H	T	U
	2	2	1	7
+	3	4	0	8

e:

	Th	H	T	U
	4	5	1	6
+	1	3	4	3

e:

	Th	H	T	U
	5	3	8	9
+	1	2	7	4

e:

	Th	H	T	U
	3	2	8	1
+	1	4	2	8

2 Use these cards to make 5 different addition problems using 2 and 3 digit numbers. Show your working out:

2	3	4	5	6	7	8	9	=	+
---	---	---	---	---	---	---	---	---	---

Written methods – subtraction

	H	T	U
	9	8 14	
-	2	7	8
	7	1	6

First we estimate: $1000 - 300 = 700$

We start with the units. We can't take 8 away from 4 so we must rename one of the tens as units. We now have 14 units.

14 subtract 8 is 6 so we put the 6 in the units column.

8 tens subtract 7 tens is 1 ten so we put a 1 in the tens column.

We subtract the hundreds. 9 hundred subtract 2 hundred is 7 hundred. Put a 7 in the hundreds column.

We check the answer against our estimate.

1 Complete the subtraction problems:

e:

a

	Th	H	T	U
	4	9	8	2
-		1	5	3

e:

b

	Th	H	T	U
	2	9	5	1
-		8	7	8

e:

c

	Th	H	T	U
	3	8	7	2
-		5	8	6

When a problem asks us to find the difference, we subtract. We always start with the larger number.

Showtown	4129 km	Tidings	1233 km
Normanville	3262 km	Ringer	7869 km
Roper	7419 km	Harpville	486 km
Ace Bay	1226 km	Eagle Bay	595 km

2 Solve these to find the difference problems:

a How far from Showtown to Ringer?

	Th	H	T	U
-				

b What is the distance from Normanville to Tidings?

	Th	H	T	U
-				

c What is the distance from Roper to Eagle Bay?

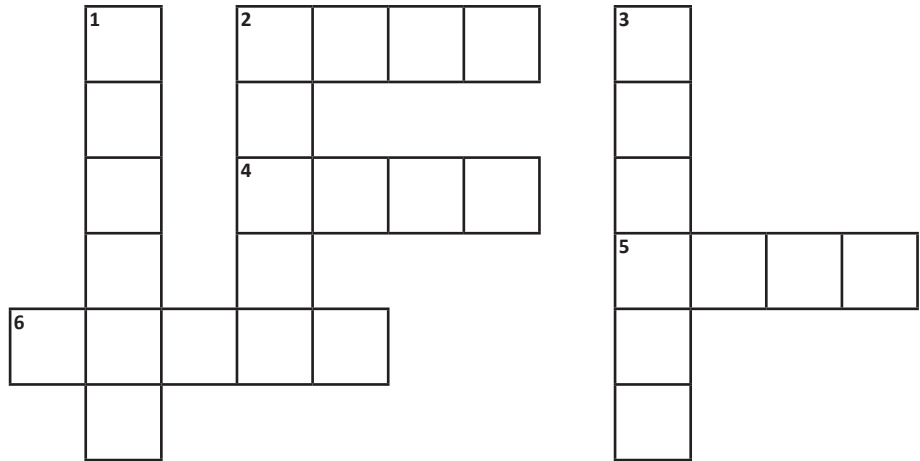
	Th	H	T	U
-				

d How far from Normanville to Ace Bay?

	Th	H	T	U
-				

Written methods – subtraction

- 3 Use a calculator to add each group of numbers. Turn your calculator upside down to see a word on the screen. Use the key below to help you identify the letters. Write each word in the correct place in the crossword puzzle.



CLUES

Across

2. $3\ 025 + 1\ 589 =$ _____
 4. $4\ 456 + 1\ 207 =$ _____
 5. $2\ 776 + 2\ 861 =$ _____
 6. $12\ 824 + 32\ 251 =$ _____

Down

1. $34\ 569 + 342\ 047 =$ _____
 2. $20\ 786 + 36\ 548 =$ _____
 3. $456\ 789 + 120\ 556 =$ _____

Key

0	1	3	4	5	6	7	8
O	I	E	H	S	G	L	B

- 4 The answer is 42. What could the missing numbers be? Come up with 5 possibilities:

	H	T	U
—			
—			
—		4	2

	H	T	U
—			
—			
—		4	2

	H	T	U
—			
—			
—		4	2

	H	T	U
—			
—			
—		4	2

	H	T	U
—			
—			
—		4	2

Written methods – adding and subtracting decimals

When we add and subtract decimals we follow the same rules we use when working with whole numbers. We need to make sure we line up the place values and the decimal points:

	T	U	T
	3	1	3
-	1	7	2
	2	6	1

1 Estimate and solve these addition problems. Remember to put the decimal point into your answers:

<p style="text-align: center;">e:</p> <p>a</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">U</td><td style="text-align: center;">T</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black; text-align: center;">5</td><td style="border-top: 1px solid black; text-align: center;">4</td><td style="border-top: 1px solid black; text-align: center;">1</td></tr> <tr><td style="border-top: 1px solid black; text-align: center;">+</td><td style="border-top: 1px solid black; text-align: center;">3</td><td style="border-top: 1px solid black; text-align: center;">1</td><td style="border-top: 1px solid black; text-align: center;">3</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td></tr> </table>		T	U	T		5	4	1	+	3	1	3					<p style="text-align: center;">e:</p> <p>b</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">U</td><td style="text-align: center;">T</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black; text-align: center;">3</td><td style="border-top: 1px solid black; text-align: center;">2</td><td style="border-top: 1px solid black; text-align: center;">3</td></tr> <tr><td style="border-top: 1px solid black; text-align: center;">+</td><td style="border-top: 1px solid black; text-align: center;">5</td><td style="border-top: 1px solid black; text-align: center;">8</td><td style="border-top: 1px solid black; text-align: center;">1</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td></tr> </table>		T	U	T		3	2	3	+	5	8	1					<p style="text-align: center;">e:</p> <p>c</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">U</td><td style="text-align: center;">T</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black; text-align: center;">4</td><td style="border-top: 1px solid black; text-align: center;">8</td><td style="border-top: 1px solid black; text-align: center;">4</td></tr> <tr><td style="border-top: 1px solid black; text-align: center;">+</td><td style="border-top: 1px solid black; text-align: center;">4</td><td style="border-top: 1px solid black; text-align: center;">1</td><td style="border-top: 1px solid black; text-align: center;">3</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td></tr> </table>		T	U	T		4	8	4	+	4	1	3					<p style="text-align: center;">e:</p> <p>d</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">U</td><td style="text-align: center;">T</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black; text-align: center;">2</td><td style="border-top: 1px solid black; text-align: center;">7</td><td style="border-top: 1px solid black; text-align: center;">8</td></tr> <tr><td style="border-top: 1px solid black; text-align: center;">+</td><td style="border-top: 1px solid black; text-align: center;">3</td><td style="border-top: 1px solid black; text-align: center;">9</td><td style="border-top: 1px solid black; text-align: center;">3</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;"></td></tr> </table>		T	U	T		2	7	8	+	3	9	3																				
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2 Estimate and solve these subtraction problems. Remember to put the decimal point into your answers:

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3 Bart finished his race in a time of 10.67 secs. Lisa finished in 11.24 secs. How much faster was Bart?

Written methods – adding and subtracting decimals

- 4 You bought the following. Find the difference between the discount price and regular price for each item, then calculate your total savings. Show all your working out:

Was \$9.99

Now \$8.50

Save \$ _____

Was \$8.50

Now \$7.99

Save \$ _____

Was \$7.35

Now \$6.85

Save \$ _____

Was \$8.95

Now \$6.50

Save \$ _____

Was \$2.89

Now \$1.65

Save \$ _____

Was \$4.66

Now \$3.89

Save \$ _____

Total savings: _____

Written methods – word problems

1 Solve the following word problems using addition or subtraction. Circle the process you use to calculate the answer:

a Joe scored 346 more points than Zac. Joe scored 589 points. How many points did Zac score?

+
-
Answer _____

b Jenny is 32 cm taller than Jaala. Jaala is 143 cm tall. How tall is Jenny?

+
-
Answer _____

c Maitland recorded 117 mm of rain. Balaklava recorded 58 mm more. How much rain did Balaklava record?

+
-
Answer _____

d Wayne has \$17. How much more money does he need to buy a t-shirt that costs \$39?

+
-
Answer _____

e Charlene had \$132. After she paid for a ticket, she had \$84. How much did the ticket cost?

+
-
Answer _____

f Sanjay spent \$34 and had \$92 left. How much did he have before the purchase?

+
-
Answer _____

g Jarred's bike cost \$189. Molly's bike cost \$263. What is the price difference between the two bikes?

+
-
Answer _____

h The rainfall in Two Wells was 73 mm. Gawler recorded 36 mm less. How much rainfall did Gawler record?

+
-
Answer _____

i Write your own word problem and solve it.

+
-
Answer _____

Mental multiplication strategies – doubling strategy

Doubling is a useful strategy to use when multiplying.

To multiply a number by four, double it twice.

$$15 \times 4 \text{ double once} = 30$$

$$\text{double twice} = 60$$

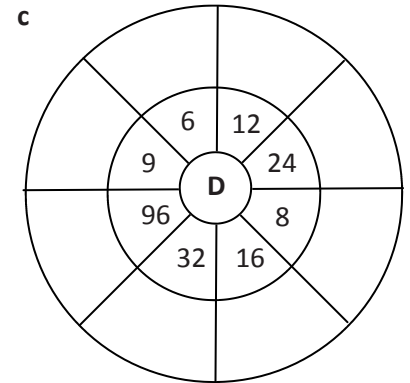
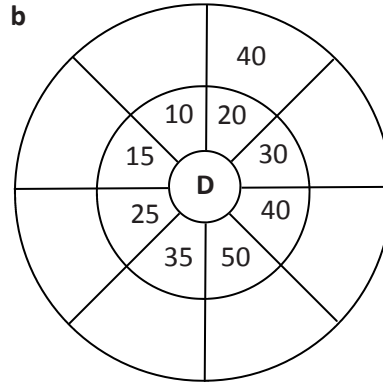
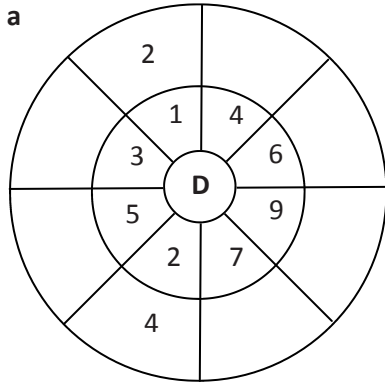
To multiply a number by eight, double it three times.

$$13 \times 8 \text{ double once} = 26$$

$$\text{double twice} = 52$$

$$\text{double three times} = 104$$

1 Warm up with some doubling practice:



2 Finish the doubling patterns:

a	4	<u> 8 </u>	<u> 16 </u>	<u> </u>	<u> 64 </u>	<u> </u>
b	3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> 96 </u>
c	5	<u> </u>	<u> </u>	<u> 40 </u>	<u> </u>	<u> </u>
d	25	<u> 50 </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
e	7	<u> </u>	<u> 28 </u>	<u> </u>	<u> </u>	<u> 224 </u>
f	75	<u> </u>	<u> 300 </u>	<u> </u>	<u> </u>	<u> </u>

3 Choose a number and create your own doubling pattern. How high can you go? What patterns can you see within your pattern?

4 Two sets of twins turn 12. They decide to have a joint birthday party with 1 giant cake but they all want their own candles. How many candles will they need?

Mental multiplication strategies – doubling strategy

5 Use the doubling strategy to solve these:

	× 2	× 4
a 13×4	<u>26</u>	<u>52</u>
b 16×4	_____	_____
c 24×4	_____	_____
d 25×4	_____	_____
e 32×4	_____	_____
f 21×4	_____	_____
g 35×4	_____	_____

To multiply by 4, double twice. To multiply by 8, double three times.



REMEMBER

6 Use the doubling strategy to solve these:

	× 2	× 4	× 8
a 12×8	<u>24</u>	_____	<u>96</u>
b 14×8	_____	_____	<u>112</u>
c 25×8	_____	_____	_____
d 21×8	_____	<u>84</u>	_____
e 13×8	_____	_____	_____
f 16×8	<u>32</u>	_____	_____

7 Work out the answers in your head using the appropriate doubling strategy. Use a table like the one above if it helps.

a $18 \times 4 =$

b $16 \times 4 =$

c $26 \times 4 =$

d $24 \times 8 =$

e $15 \times 8 =$

f $22 \times 8 =$

8 Nick's dad offered him two methods of payment for helping with a 5 week landscaping project.

Method 1: \$24 a week for 5 weeks.

Method 2: \$8 for the first week, then double the payment each week.

Which method would earn Nick the most money? Why?

Mental multiplication strategies – multiply by 10s, 100s and 1 000s

When we multiply by 10 we move the number one place value to the left.

When we multiply by 100 we move the number two place values to the left.

When we multiply by 1 000 we move the number three place values to the left.

Look at how this works with the number 45:

Ten Thousands	Thousands	Hundreds	Tens	Units	
			4	5	
		4	5	0	× 10
	4	5	0	0	× 100
4	5	0	0	0	× 1 000

1 Multiply the following numbers by 10, 100 and 1 000:

a

T Th	Th	H	T	U	
			1	7	
					× 10
					× 100
					× 1 000

b

T Th	Th	H	T	U	
			4	3	
					× 10
					× 100
					× 1 000

c

T Th	Th	H	T	U	
			8	5	
					× 10
					× 100
					× 1 000

d

T Th	Th	H	T	U	
			9	9	
					× 10
					× 100
					× 1 000

2 Try these:

a $14 \times 10 =$

b $14 \times 100 =$

c $14 \times 1\,000 =$

d $92 \times 10 =$

e $92 \times 1\,000 =$

f $92 \times 100 =$

g $11 \times 1\,000 =$

h $11 \times 100 =$

i $11 \times 10 =$

3 You'll need a partner and a calculator for this activity. Take turns giving each other problems such as "Show me 100×678 ". The person whose turn it is to solve the problem, writes down their prediction and you both check it on the calculator. 10 points for each correct answer, and the first person to 50 points wins.

Mental multiplication strategies – multiply by 10s, 100s and 1 000s

It is also handy to know how to multiply multiples of 10 such as 20 or 200 in our heads.

4×2 helps us work out 4×20 : $4 \times 2 = 8$ $4 \times 20 = 80$

We can express this as $4 \times 2 \times 10 = 80$ How would you work out 4×200 ?

4 Use patterns to help you solve these:

- | | | | |
|---|----------------------|-----------------------|------------------------|
| a | 5×2 _____ | 5×20 _____ | 5×200 _____ |
| b | 2×9 _____ | 2×90 _____ | 2×900 _____ |
| c | $6 \times \$4$ _____ | $6 \times \$40$ _____ | $6 \times \$400$ _____ |
| d | 8×3 _____ | 8×30 _____ | 8×300 _____ |
| e | $3 \times \$7$ _____ | $3 \times \$70$ _____ | $3 \times \$700$ _____ |
| f | 2×8 _____ | 20×8 _____ | 200×8 _____ |
| g | 3×9 _____ | 30×9 _____ | 300×9 _____ |

5 Answer these problems:

- a Jock runs 50 km per week. How far does he run over 10 weeks?
- b Huy earns \$20 pocket money per week. If he saves half of this, how much will he have saved at the end of 8 weeks?
- c The sum of two numbers is 28. When you multiply them together, the answer is 160. What are the numbers?

If you're struggling with your tables, get onto Live Mathematics and practise!



6 Finish these counting patterns:

- | | | | | | | | | |
|---|-----|-----|-------|-------|-------|-------|-------|-------|
| a | 10 | 20 | _____ | 30 | _____ | _____ | _____ | 60 |
| b | 20 | 40 | _____ | _____ | 80 | _____ | _____ | _____ |
| c | 30 | 60 | _____ | _____ | _____ | 150 | _____ | _____ |
| d | 40 | 80 | _____ | _____ | _____ | 200 | _____ | 240 |
| e | 50 | 100 | _____ | 150 | _____ | _____ | _____ | _____ |
| f | 100 | 200 | _____ | _____ | 400 | _____ | _____ | _____ |
| g | 200 | 400 | _____ | _____ | _____ | _____ | _____ | 1 200 |

Mental multiplication strategies – split strategy

Sometimes it's easier to split a number into parts and work with the parts separately.

Look at 64×8

Split the number into 60 and 4

Work out (60×8) and then (4×8)

Add the answers together $480 + 32 = 512$

1 Use the split strategy to answer the questions:

a 46×4

$(40 \times 4) + (6 \times 4)$

_____ + _____
=

b 74×5

$(__ \times __) + (__ \times __)$

_____ + _____
=

c 48×4

$(__ \times __) + (__ \times __)$

_____ + _____
=

d 37×7

$(__ \times __) + (__ \times __)$

_____ + _____
=

e 62×8

$(__ \times __) + (__ \times __)$

_____ + _____
=

f 91×5

$(__ \times __) + (__ \times __)$

_____ + _____
=

2 Use the split strategy to answer the questions. This time see if you can do the brackets in your head:

a $48 \times 8 = ______ + ______ = \text{$

b $52 \times 7 = ______ + ______ = \text{$

c $9 \times 43 = ______ + ______ = \text{$

d $8 \times 29 = ______ + ______ = \text{$

e $86 \times 7 = ______ + ______ = \text{$



THINK

3 These problems have been worked out incorrectly. Circle where it all went wrong.

a 37×6

$(30 \times 6) + (7 \times 6)$

$180 + 13$

$= 193$

b 17×5

$(10 \times 5) + (7 \times 5)$

$70 + 35$

$= 105$

c 32×9

$(30 \times 9) + (2 \times 9)$

$27 + 18$

$= 45$

Mental multiplication strategies – compensation strategy

When multiplying we can round to an easier number and then adjust.

Look how we do this with 4×29

29 is close to 30. We can do 4×30 in our heads because we know $4 \times 3 = 12$

$$4 \times 30 = 120$$

We have to take off 4 because we used one group of 4 too many: $120 - (1 \times 4) = 116$

$$4 \times 29 = 116$$

1 Use the compensation strategy to answer the questions. The first one has been done for you.

a $19 \times 3 = \underline{20} \times \underline{3} - \underline{3} = \boxed{57}$

b $8 \times 29 = \underline{\quad} \times \underline{\quad} - \underline{\quad} = \boxed{\quad}$

c $18 \times 6 = \underline{\quad} \times \underline{\quad} - \underline{\quad} = \boxed{\quad}$

d $7 \times 39 = \underline{\quad} \times \underline{\quad} - \underline{\quad} = \boxed{\quad}$

e $28 \times 5 = \underline{\quad} \times \underline{\quad} - \underline{\quad} = \boxed{\quad}$

We can also adjust up. Look how we do this with 6×62 :

62 is close to 60. We can do 6×60 in our heads because we know $6 \times 6 = 36$

$$6 \times 60 = 360$$

We have to then add 2 more lots of 6: $360 + 12 = 372$

$$6 \times 62 = 372$$

2 Use the compensation strategy and adjust up for these. The first one has been done for you.

a $41 \times 3 = \underline{40} \times \underline{3} + \underline{3} = \boxed{123}$

b $81 \times 4 = \underline{\quad} \times \underline{\quad} + \underline{\quad} = \boxed{\quad}$

c $22 \times 9 = \underline{\quad} \times \underline{\quad} + \underline{\quad} = \boxed{\quad}$

d $32 \times 9 = \underline{\quad} \times \underline{\quad} + \underline{\quad} = \boxed{\quad}$

e $7 \times 62 = \underline{\quad} \times \underline{\quad} + \underline{\quad} = \boxed{\quad}$

Would I use the compensation strategy with numbers such as 56 or 84? Why or why not?



THINK

Mental multiplication strategies – factors and multiples

Factors are the numbers we multiply together to get to another number:

$$\text{factor} \times \text{factor} = \text{whole number}$$

How many factors does the number 12 have? $4 \times 3 = 12$, $6 \times 2 = 12$, $1 \times 12 = 12$
4, 3, 6, 2, 1 and 12 are all factors of 12.

1 List the factors of these numbers:

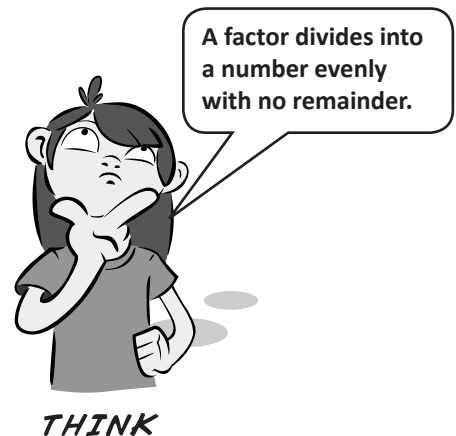
a	18								
c	14								
e	16								
g	30								

b	25								
d	9								
f	15								
h	42								

2 Fill the gaps in these sentences. The first one has been done for you.

- a 1 or 16 or 2 or 8 or 4 people can share 16 lollies evenly.
- b _____ or _____ or _____ or _____ or _____ or _____ people can share 20 slices of pie evenly.
- c _____ or _____ or _____ or _____ or _____ or _____ or _____ or _____ people can share 24 cherries.
- d _____ or _____ or _____ or _____ or _____ or _____ or _____ or _____ people can share 30 pencils.
- e _____ or _____ people can share 5 balls evenly.

3 Use a calculator to help you find as many factors of 384 as you can:



Mental division strategies – use multiplication facts

Knowing our multiplication facts helps us with division as they do the reverse of each other. They are inverse operations.

$$3 \times 5 = 15$$

$$15 \div 5 = 3$$

1 Use your knowledge of multiplication facts to help answer these division questions:

a $56 \div 7$ \curvearrowright $\underline{\quad 8 \quad} \times 7 = 56$ \curvearrowright $56 \div 7 = \square$

b $121 \div 11$ \curvearrowright $\underline{\quad \quad} \times 11 = 121$ \curvearrowright $121 \div 11 = \square$

c $72 \div 8$ \curvearrowright $\underline{\quad \quad} \times 8 = 72$ \curvearrowright $72 \div 8 = \square$

d $49 \div 7$ \curvearrowright $\underline{\quad \quad} \times 7 = 49$ \curvearrowright $49 \div 7 = \square$

e $36 \div 9$ \curvearrowright $\underline{\quad \quad} \times 9 = 36$ \curvearrowright $36 \div 9 = \square$

f $64 \div 8$ \curvearrowright $\underline{\quad \quad} \times 8 = 64$ \curvearrowright $64 \div 8 = \square$

g $108 \div 12$ \curvearrowright $\underline{\quad \quad} \times 12 = 108$ \curvearrowright $108 \div 12 = \square$

2 Now try these:

a $81 \div 9 = \square$

b $40 \div 5 = \square$

c $21 \div 3 = \square$

d $54 \div 6 = \square$

e $42 \div 7 = \square$

f $63 \div 9 = \square$

g $36 \div 4 = \square$

h $45 \div 9 = \square$

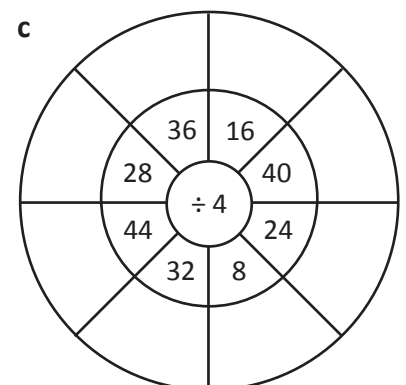
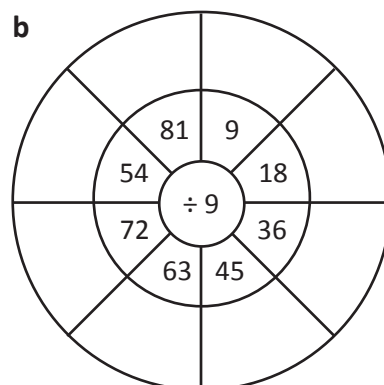
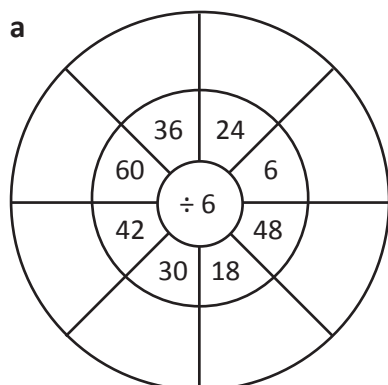
i $39 \div 3 = \square$

j $24 \div 6 = \square$



Doing maths without knowing your multiplication facts is hard. Learning them makes your life much easier. It's worth persevering to conquer them!

3 Fill in the division wheels. Use multiplication facts to help you.



Mental division strategies – use multiplication facts

Knowing our families of facts is also helpful.

$3 \times 5 = 15$

$5 \times 3 = 15$

$15 \div 5 = 3$

$15 \div 3 = 5$

- 4 Complete the following patterns. How many more multiplication and division facts can you find, given the first fact?

a $7 \times 8 = 56$

$8 \times 7 = \square$

$56 \div \square = 8$

$\square \div 8 = 7$

b $8 \times 9 = 72$

$9 \times 8 = \square$

$72 \div \square = 9$

$\square \div 9 = 8$

c $7 \times 9 = 63$

$9 \times 7 = \square$

$63 \div \square = 9$

$\square \div 9 = 7$

- 5 Write down another multiplication fact and two division facts for each question.

a $6 \times 7 = 42$

b $5 \times 9 = 45$

c $9 \times 6 = 54$

d $17 \times 8 = 136$

e $12 \times 8 = 96$

f $11 \times 21 = 231$

- 6 Look at these two division facts: $20 \div 5 = 4$ and $20 \div 4 = 5$

Imagine you're explaining to a younger child how they're related yet different. How would you do it? What would you say/write/draw?

Mental division strategies – divide by 10s, 100s and 1 000s

When we divide by 10 we move the number one place value to the right.

When we divide by 100 we move the number two place values to the right.

When we divide by 1 000 we move the number three place values to the right.

Look what happens to 45 000 when we apply these rules:

Ten Thousands	Thousands	Hundreds	Tens	Units	
4	5	0	0	0	
	4	5	0	0	÷ 10
		4	5	0	÷ 100
			4	5	÷ 1 000

1 Divide the following numbers by 10, 100 and 1 000:

a

T Th	Th	H	T	U	
4	5	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

b

T Th	Th	H	T	U	
4	3	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

c

T Th	Th	H	T	U	
8	5	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

d

T Th	Th	H	T	U	
8	8	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

2 Draw lines to match the answers with the questions:

a What number is one thousand times smaller than 32 000?

9 500

b What number is one hundred times smaller than 32 000?

88

c What number is one hundred times smaller than 95 000?

950

d What number is ten times smaller than 95 000?

880

e What number is one hundred times smaller than 8 800?

320

f What number is ten times smaller than 8 800?

32

Mental division strategies – halving strategy

When the two numbers seem too large to work with in our heads, we can halve them till we get to a division fact we recognise. Both numbers must be even for this to work.

$$126 \div 14$$

$$(\text{half } 126) \div (\text{half } 14)$$

$$63 \div 7 = 9$$

1 Practise your halving. The first one has been done for you.

a

32	halve	16
56		
36		
84		
96		

b

24	halve	
48		
72		
144		
192		

c

50	halve	
500		
1 000		
250		
100		

2 Halve each number to get to a recognisable division fact. The first one has been done for you.

a $112 \div 14$ $\frac{56}{\quad} \div \frac{7}{\quad} = \boxed{8}$

b $144 \div 16$ $\frac{\quad}{\quad} \div \frac{\quad}{\quad} = \boxed{\quad}$

c $96 \div 12$ $\frac{\quad}{\quad} \div \frac{\quad}{\quad} = \boxed{\quad}$

d $220 \div 4$ $\frac{\quad}{\quad} \div \frac{\quad}{\quad} = \boxed{\quad}$

e $162 \div 18$ $\frac{\quad}{\quad} \div \frac{\quad}{\quad} = \boxed{\quad}$

3 Match the problems with their halved equivalents. Then solve the problem. The first one has been done for you.

a $90 \div 18$	$60 \div 6$	= $\boxed{5}$
b $64 \div 16$	$24 \div 8$	= $\boxed{\quad}$
c $120 \div 12$	$35 \div 7$	= $\boxed{\quad}$
d $70 \div 14$	$45 \div 9$	= $\boxed{\quad}$
e $144 \div 24$	$72 \div 12$	= $\boxed{\quad}$
f $48 \div 16$	$32 \div 8$	= $\boxed{\quad}$

Mental division strategies – halving strategy

Sometimes we need to keep halving until we reach an easy division fact.

$$144 \div 36 \rightarrow 72 \div 18 \rightarrow 36 \div 9 = 4$$

- 4 Keep halving until you get to a fact you can work with. If you can do it in your head, just fill in the last box. Otherwise, use the lines to help you.

a $216 \div 36 =$ _____ \div _____ $=$ _____ \div _____ $=$

b $196 \div 28 =$ _____ \div _____ $=$ _____ \div _____ $=$

c $224 \div 32 =$ _____ \div _____ $=$ _____ \div _____ $=$

d $168 \div 24 =$ _____ \div _____ $=$ _____ \div _____ $=$

e $144 \div 36 =$ _____ \div _____ $=$ _____ \div _____ $=$

f $288 \div 72 =$ _____ \div _____ $=$ _____ \div _____ $=$

- 5 Draw lines to connect numbers that could be doubled or halved to reach each other.

48	10	16	40
20	32	25	64
128	60	96	30
125	256	192	120
100	250	80	50

- 6 Work with a partner to solve this problem using halving:

You have an after school job at the local lolly shop, making up the mixed lolly bags. Today, you have to evenly share 288 freckles among 48 bags. How many freckles will you put in each bag? Show each halved sum.

Mental division strategies – split strategy

Division problems also become easier if you split the number to be divided into recognisable facts.

Look at the problem $144 \div 9$

Can we divide 144 into 2 multiples of 9?

We can divide it into 54 and 90. These are both easily divided by 9. Then we add the two answers together.

$$\begin{array}{r}
 144 \div 9 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} 90 \\ \hline \div 9 \\ \hline 10 \end{array} \quad \begin{array}{r} 54 \\ \hline \div 9 \\ \hline 6 \end{array} \\
 10 + 6 = 16
 \end{array}$$

1 Use the split strategy to divide these numbers. Use the clues to guide you:

a

$$\begin{array}{r}
 112 \div 8 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} 80 \\ \hline \div 8 \\ \hline \end{array} \quad \begin{array}{r} 32 \\ \hline \div 8 \\ \hline \end{array} \\
 \underline{\quad} + \underline{\quad} = \boxed{\quad}
 \end{array}$$

b

$$\begin{array}{r}
 85 \div 5 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} 50 \\ \hline \div 5 \\ \hline \end{array} \quad \begin{array}{r} \quad \\ \hline \div 5 \\ \hline \end{array} \\
 \underline{\quad} + \underline{7} = \boxed{\quad}
 \end{array}$$

c

$$\begin{array}{r}
 78 \div 6 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} \quad \\ \hline \div 6 \\ \hline \end{array} \quad \begin{array}{r} 18 \\ \hline \div 6 \\ \hline \end{array} \\
 \underline{10} + \underline{\quad} = \boxed{\quad}
 \end{array}$$

d

$$\begin{array}{r}
 64 \div 4 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} 24 \\ \hline \div 4 \\ \hline \end{array} \quad \begin{array}{r} \quad \\ \hline \div 4 \\ \hline \end{array} \\
 \underline{\quad} + \underline{\quad} = \boxed{\quad}
 \end{array}$$

e

$$\begin{array}{r}
 91 \div 7 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} 21 \\ \hline \div 7 \\ \hline \end{array} \quad \begin{array}{r} \quad \\ \hline \div 7 \\ \hline \end{array} \\
 \underline{\quad} + \underline{\quad} = \boxed{\quad}
 \end{array}$$

f

$$\begin{array}{r}
 144 \div 8 \\
 \swarrow \quad \searrow \\
 \begin{array}{r} 80 \\ \hline \div 8 \\ \hline \end{array} \quad \begin{array}{r} 64 \\ \hline \div 8 \\ \hline \end{array} \\
 \underline{\quad} + \underline{\quad} = \boxed{\quad}
 \end{array}$$

2 Now try these:

a

$$90 \div 6 \begin{cases} \rightarrow \frac{60}{\hline \div 6} \\ \rightarrow \frac{30}{\hline \div 6} \end{cases} = \boxed{\quad}$$

b

$$105 \div 7 \begin{cases} \rightarrow \frac{70}{\hline \div \quad} \\ \rightarrow \frac{\quad}{\hline \div \quad} \end{cases} = \boxed{\quad}$$

c

$$72 \div 4 \begin{cases} \rightarrow \frac{\quad}{\hline \div \quad} \\ \rightarrow \frac{24}{\hline \div \quad} \end{cases} = \boxed{\quad}$$

d

$$144 \div 8 \begin{cases} \rightarrow \frac{\quad}{\hline \div \quad} \\ \rightarrow \frac{96}{\hline \div \quad} \end{cases} = \boxed{\quad}$$

Hmmm ... $91 \div 7$.
The unit digit helps me here. What multiple of 7 ends in 1? I know, 21.
So that makes the other number 70!



DISCOVER

Written methods – contracted multiplication

Contracted multiplication is one way to solve a multiplication problem.

First we use our mental strategies to estimate an easier problem:

$3 \times 150 = 450$. The answer will be around 450.

We start with the units. 3×6 is 18 units. We rename this as 1 ten and 8 units.

We put 8 in the units column and carry the 1 to the tens column.

3×5 plus the carried 1 is 16 tens. We rename this as 1 hundred and 6 tens.

We put 6 in the tens column and carry the 1 to the hundreds column.

3×1 plus the carried 1 is 4 hundreds. We put 4 in the hundreds column.

	H	T	U
	¹ 1	¹ 5	6
x			3
	4	6	8

1 Solve these problems using contracted multiplication. Estimate first:

e:

a

	H	T	U
	3	2	7
x			3

e:

b

	H	T	U
	2	4	7
x			4

e:

c

	H	T	U
	1	5	4
x			5

e:

d

	H	T	U
	3	1	5
x			3

e:

e

	H	T	U
	2	8	6
x			2

e:

f

	H	T	U
	1	9	4
x			5

2 Solve these word problems. Show how you worked them out:

- a Dan's dad has resorted to bribery to counteract Dan's PlayStation addiction. For every evening, Dan spends away from the PlayStation, his dad pays him \$3. So far, Dan has racked up an impressive 27 nights (though he looks like breaking any day now). How much money does this equate to?

- b Dan's mum thinks she might get in on the action too and pays Dan \$4 for every week that he puts his dishes in the dishwasher and his dirty clothes in the basket. Dan is less keen on this plan but does manage 33 weeks in 1 year. How much has he made out of this scheme?

Written methods – contracted multiplication

3 Below are Jess and Harry's tests. Check them and give them a mark out of 5. If they made mistakes, give them some feedback as to where they went wrong.

Jess

$$\begin{array}{r} ^1 3 ^1 8 7 \\ \times 2 \\ \hline 7 7 4 \\ \hline \end{array}$$

$$\begin{array}{r} 1 1 9 \\ \times 7 \\ \hline 7 7 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2 0 3 \\ \times 3 \\ \hline 6 0 9 \\ \hline \end{array}$$

$$\begin{array}{r} 4 ^1 3 6 \\ \times 3 \\ \hline 1 2 0 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 0 1 \\ \times 7 \\ \hline 2 8 0 7 \\ \hline \end{array}$$

Harry

$$\begin{array}{r} ^1 3 ^1 8 7 \\ \times 2 \\ \hline 7 7 4 \\ \hline \end{array}$$

$$\begin{array}{r} ^1 1 ^6 1 9 \\ \times 7 \\ \hline 8 3 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2 0 3 \\ \times 3 \\ \hline 6 9 \\ \hline \end{array}$$

$$\begin{array}{r} ^1 4 ^1 3 6 \\ \times 3 \\ \hline 1 3 0 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 0 1 \\ \times 7 \\ \hline 2 8 7 \\ \hline \end{array}$$

Written methods – extended multiplication

3 Use extended multiplication to solve these problems:

a Jack and his 2 friends bought tickets to the World Cup. Each ticket costs \$124. How much did they spend altogether?

e:

b Jack has a paper round and earns \$7 per day. He works for 18 days and saves it all. Has he earned enough to pay for his World Cup ticket?

e:

c Yusuf's highest Level 1 Live Mathletics score is 112. Yep, he's fast. If he scores this 7 times in a row, how many correct answers has he achieved?

e:

d Kyra's class of 24 all had to stay in for 11 minutes of their recess. Something to do with too much talking. How many minutes is this in total?

e:

4 Once you have the hang of extended multiplication, you can apply it to larger numbers. Try these:

a

	2	4	5	
x		3	2	
				(2 × 5)
				(2 × 40)
				(2 × 200)
				(30 × 5)
				(30 × 40)
				(30 × 200)

b

	3	2	9	
x		4	3	
				(3 × 9)
				(3 × 20)
				(3 × 300)
				(40 × 9)
				(40 × 20)
				(40 × 300)

c

	2	3	8	
x		5	2	
				(2 × 8)
				(2 × 30)
				(2 × 200)
				(50 × 8)
				(50 × 30)
				(50 × 200)

Written methods – short division

In short division, we use our knowledge of multiplication to help us. We can split 936 into $900 + 30 + 6$.

$$\begin{array}{r} 3 \quad 1 \quad 2 \\ 3 \overline{) 9 \quad 3 \quad 6} \end{array}$$

900 divided by 3 is 300, so we put a 3 in the hundreds place.

30 divided by 3 is 10, so we put a 1 in the tens place.

6 divided by 3 is 2, so we put a 2 in the units place.

$$936 \div 3 = 312$$

1 Divide these numbers:

a

$$4 \overline{) 8 \quad 4}$$

b

$$5 \overline{) 5 \quad 5}$$

c

$$3 \overline{) 9 \quad 3}$$

d

$$9 \overline{) 9 \quad 9 \quad 0}$$

e

$$4 \overline{) 4 \quad 8 \quad 4}$$

f

$$6 \overline{) 6 \quad 6 \quad 6}$$

g

$$3 \overline{) 9 \quad 9 \quad 9}$$

h

$$2 \overline{) 4 \quad 6 \quad 2}$$

i

$$3 \overline{) 6 \quad 9 \quad 3}$$

Sometimes it's easier to split the numbers differently. We can also split 936 into $900 + 36$.

$$\begin{array}{r} 3 \quad 1 \quad 2 \\ 3 \overline{) 9 \quad 3 \quad 6} \end{array}$$

900 divided by 3 is 300 so we put a 3 in the hundreds place

36 divided by 3 is 12. We put the 1 in the tens place and the 2 in the units place.

$$936 \div 3 = 312$$

In these problems, if there are no tens in a number we put a 0 in to show this and also to hold the place of the other numbers!



2 Decide how you'll split these numbers and then divide. Remember to put in zeros as needed.

a

$$5 \overline{) 5 \quad 1 \quad 5}$$

b

$$3 \overline{) 6 \quad 6 \quad 9}$$

c

$$9 \overline{) 9 \quad 2 \quad 7}$$

d

$$4 \overline{) 8 \quad 0 \quad 4}$$

e

$$4 \overline{) 8 \quad 1 \quad 2}$$

Written methods – short division with remainders

Sometimes numbers don't divide evenly. The amount left over is called the **remainder**.

$$\begin{array}{r} 105 \text{ r } 2 \\ 5 \overline{) 527} \end{array}$$

Look at 527 divided by 5.

500 divided by 5 is 100.

27 divided by 5 is 5 with 2 left over (this is the remainder).

This can be written as r 2.

$$527 \div 5 = 105 \text{ r } 2.$$

1 Divide these 2 digit numbers. Each problem will have a remainder.

a
$$\begin{array}{r} \text{ r } \\ 9 \overline{) 75} \end{array}$$

b
$$\begin{array}{r} \text{ r } \\ 4 \overline{) 47} \end{array}$$

c
$$\begin{array}{r} \text{ r } \\ 6 \overline{) 38} \end{array}$$

d
$$\begin{array}{r} \text{ r } \\ 5 \overline{) 63} \end{array}$$

e
$$\begin{array}{r} \text{ r } \\ 4 \overline{) 49} \end{array}$$

f
$$\begin{array}{r} \text{ r } \\ 6 \overline{) 62} \end{array}$$

2 Divide these 3 digit numbers. Each problem will have a remainder.

a
$$\begin{array}{r} \text{ r } \\ 5 \overline{) 557} \end{array}$$

b
$$\begin{array}{r} \text{ r } \\ 3 \overline{) 661} \end{array}$$

c
$$\begin{array}{r} \text{ r } \\ 4 \overline{) 481} \end{array}$$

d
$$\begin{array}{r} \text{ r } \\ 9 \overline{) 994} \end{array}$$

e
$$\begin{array}{r} \text{ r } \\ 4 \overline{) 845} \end{array}$$

f
$$\begin{array}{r} \text{ r } \\ 6 \overline{) 638} \end{array}$$

3 Solve these problems:

a Giovanni's Nonna has given him a bag of gold coins to share among him and his two sisters. There are 47 gold coins altogether. How many does each child get if they're shared evenly? How would you suggest they deal with the remainder?

b You have 59 jubes to add to party bags. Each bag gets 5 jubes. How many full party bags can you make?

Written methods – short division with remainders

There are 3 ways of expressing remainders. How we do it depends on how we'd deal with the problem in the real world. Look at:

$$\begin{array}{r} 105r2 \\ 5 \overline{) 527} \end{array}$$

- 4** One way is to write $r2$ as in the example above. We use this when we don't care about being absolutely precise and when the remainder can't be easily broken up. An example would be sharing 527 jelly beans among 5 people. Solve these problems expressing the remainders as r .

a Share 126 blue pencils among 4 people.

b Share 215 paper clips among 7 people.

- 5** We can also express a remainder as a fraction. We do this when we can easily share the remainder. For example, 19 cakes shared among 3 people is 6 and one third each. Solve these problems expressing the remainder as a fraction:

a Share 13 pizzas among 4 people.

b Share 50 sandwiches among 3 people.

$$\begin{array}{r} 6\frac{1}{3} \\ 3 \overline{) 19} \end{array}$$



REMEMBER

- 6** We express remainders as decimals when we must be absolutely precise. Sharing dollar amounts is a good example of this. We add the cents after the decimal point to help us. Try these:

a Share 12 dollars among 4 people.

b Share 27 dollars between 2 people.

$$\begin{array}{r} \\ 4 \overline{) 12.00} \end{array}$$

$$\begin{array}{r} \\ 2 \overline{) 27.00} \end{array}$$

27 divided by 2 is 13. Now we have one dollar left. How many cents is half of one dollar?

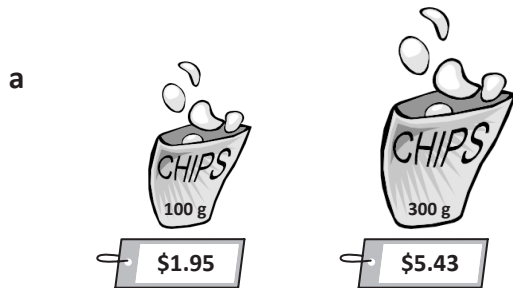


THINK

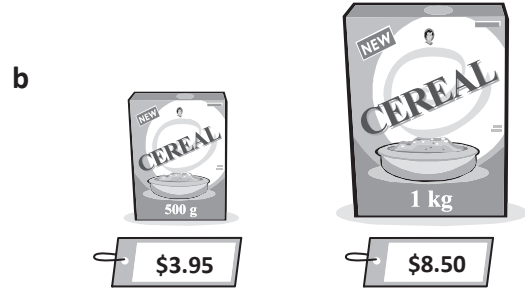
Written methods – solving problems

We regularly come across multiplication and division problems in our everyday life. It doesn't matter which strategy we use to solve them, we can choose the one that suits us or the problem best.

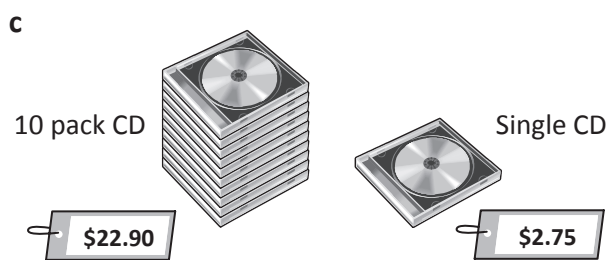
- 1 One real-life problem is comparing prices to find the best deal. It's easy if the prices and amounts are the same but what if the amounts are different? Use a strategy to help you find the best deal on these:



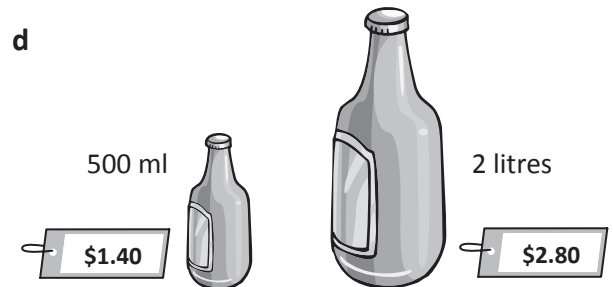
Best deal is _____



Best deal is _____



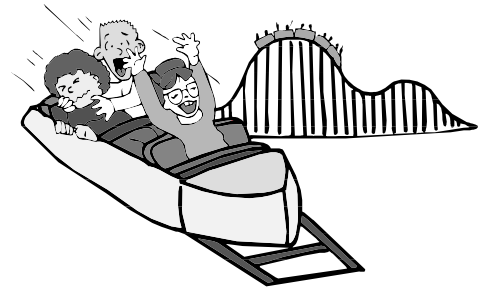
Best deal is _____



Best deal is _____

- 2 You go to the service station with your weekly pocket money of \$5. When you take a \$1.75 chocolate bar to the counter, they offer you the special of 3 bars for \$4.50. Which is a better deal? Show why.

Written methods – solving problems



- 3 You're planning a trip to the Wet and Wild theme park and there are many ticket options. Use a strategy of your choice and the price list below to answer the following questions:

Entry

1-day pass **\$32**

2-day pass **\$48**

Annual pass **\$99**

Individual rides **\$12**

10-ride pass **\$95**

Order online **\$5 discount**

Extras

5-minute helicopter ride **\$42**

10-minute helicopter ride **\$74**

30-minute helicopter ride **\$209**

Sunset cruise **\$12**

Lunch cruise **\$22**

Swim with the dolphins **\$75**

- a If you buy a 2-day pass, what is the cost per day?
- b How much cheaper is this option than buying two 1-day passes?
- c If you bought an annual pass, how many times would you need to visit to make it a better option than buying either a 1-day or 2-day pass?
- d What if you choose just the rides? How much would you save if you bought the 10-ride pass instead of the individual rides?
- e If you took a 5-minute helicopter ride, what would be the cost per minute?
- f What about if you chose the 10-minute flight option? What would be the cost per minute?
- g Plan a day's itinerary for you and a partner. How much will this cost?



What to do

Use your knowledge of multiplication to work out the missing values:

a

$$\begin{array}{r} 28 \\ \times 3 \\ \hline 8 \square \\ \hline \end{array}$$

b

$$\begin{array}{r} 7 \square \\ \times 4 \\ \hline 288 \\ \hline \end{array}$$

c

$$\begin{array}{r} \square 7 \\ \times 5 \\ \hline 235 \\ \hline \end{array}$$

d

$$\begin{array}{r} 8 \square \\ \times 9 \\ \hline 729 \\ \hline \end{array}$$

e

$$\begin{array}{r} 68 \\ \times \square \\ \hline 204 \\ \hline \end{array}$$

f

$$\begin{array}{r} \square 23 \\ \times \square \\ \hline 6584 \\ \hline \end{array}$$

g

$$\begin{array}{r} 261 \\ \times \square \\ \hline \square \square 44 \\ \hline \end{array}$$

h

$$\begin{array}{r} 42 \\ \times \square 3 \\ \hline 126 \\ \square 680 \\ \hline \square \square \square \square \\ \hline \end{array}$$

i

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 392 \\ \square \square \square \square \\ \hline \square \square \square \square \\ \hline \end{array}$$



What to do

Fill in the multiplication and division tables by working out the missing digits. The arrows show you some good starting places.

			↓	
×			7	6
→		20	16	14
	5		40	
→				36
	3	30		

			↓		↓
×		8	9		
12	24				
3				12	
	14				
			54		

×			3	
4				32
		14		
	45		27	
12		24		

×			9	
	6			
11	33	44		
			63	
8				64