Mathletics

Series F Student

Reading and Understanding Whole Numbers

My name

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Series F – Reading and Understanding Whole Numbers

Contents

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Looking at whole numbers – read and write numbers to 100 000

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

Thousands	Hundreds	Tens	Ones
6	7	1	5
six thousand	seven hundred	fifteen	

1 **Express the following in numerals:**

a four thousand three hundred sixty two _____

b three hundred twenty four _____

c eight thousand nine hundred three _____

d four thousand eight hundred forty one _____

e seven hundred three _____

f five thousand four hundred 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 ninety
2 709	one thousand three
8 341	four thousand six hundred thirty nine
1 003	two thousand seven hundred nine
6 790	eight thousand three hundred forty one

Looking at whole numbers – read and write numbers to 100 000

We read and write large numbers in groups of three.

321 4 321 54 321

We work from right to left and we put a gap between each group of numbers.

4 **These numbers have been grouped incorrectly. Re-group the numbers and read the new numbers out loud to a partner. Ask them to check your grouping. Are you correct?**

a 56 78 ☐

b 65 89 ☐

c 856 21 ☐

d 33333 ☐

e 10 0000 ☐

f 4514 2 ☐

The abbreviation K comes from the Greek word *khilioi*, and it means thousand. It is used in many job advertisements and in measurement. A salary of 70 K is $70 000, and 1 000 grams is 1 kilogram.

When else do we use the term kilo or K?

5 **Convert the following abbreviations into numerals:**

a $60 K $

b 4 000 metres km

c $66 K $

d 3 000 grams kg

6 **Are the following statements true or false?**

a $36 K = $3 600	True / False
b Seventy four thousand three hundred two = 74 320	True / False
c Seventy four thousand thirty nine = 74 039	True / False
d $51 K = $51 000	True / False
e Ninety nine thousand eight hundred five = 99 805	True / False
f Fifty one thousand sixty = 5 560	True / False

Looking at whole numbers – order numbers to 100 000

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, 68 457, 15 468, 25 015, 98 652, 12 698

_____, _____, _____, _____, _____, _____

4 **Arrange the following numbers in *descending* order:**

36 817, 48 453, 15 468, 25 013, 89 632, 12 898

_____, _____, _____, _____, _____, _____

Looking at whole numbers – order numbers to 100 000

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

a **23 560**

37 682

b **23 692**

25 692

c **10 420**

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 ☐

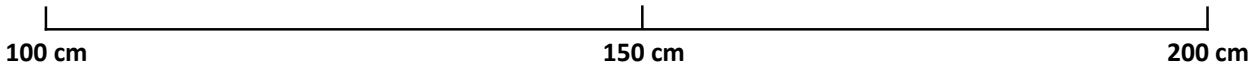
e Between 34 612 and 38 901 ☐

f Less than half of 88 000 ☐

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

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

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



Looking at whole numbers – represent and compare numbers

1 **Use the following digits to make:**

a The highest number

b The lowest odd number

c The lowest number

d The amount of money you would like to win

e The highest even number

2 **Use the digits** 5 2 6 3 8 **to make different 3 digit numbers.**

3 **Use the numbers you have made in Question 2 to make the statements true:**

a is greater than

b is less than

c is close to

d is about double

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	70 324	79 975
Braggersville	90 382	95 194
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 ones 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.

_____

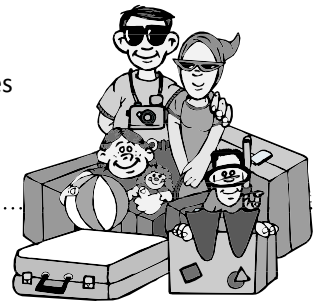
f Your family moved here in 1996 and since then, the population has nearly doubled. Where did you move to?

_____

It's holiday time! apply

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 grandma 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 partner to see if they can work out the rule that you have applied.

The new place is right! apply

Getting ready

The aim of this game is to order as many numbers on a game board as possible. You'll play the game in a group of 3 or 4. You'll need a pencil and the game show boards below.

What to do

THINK

1. Decide who will be the game show host and who will be the contestants.
2. The host calls a number between the values specified at the top of the board. Start with Game 1.
3. Without showing the host, the contestants choose where they will put the number on their own board. The numbers must be placed in order going up from the lowest number. Once a number is placed, it cannot be moved.
4. The host calls another number. If the contestants can place it on their board, they do so.
5. After the host has called 8 numbers, the person with the most numbers on the board wins. They score a point.
6. Play 3 games. The person with the highest score after 3 games wins.
7. You can play again and choose your own number ranges. You will need to draw your own boards.

Game 1 1 – 50	Game 2 50 – 100	Game 3 500 – 1 000

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?

_____

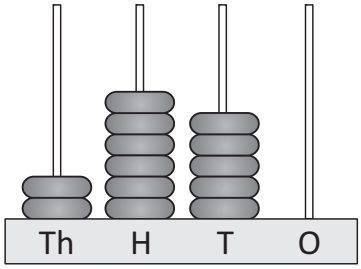
Place value of whole numbers – expanded notation

4 Play expanded notation memory with a partner. Make a copy of this page, cut out the cards, mix them up and place them face down. Take turns turning over two cards at a time. Each time you make a match, you keep the set. The person with the most cards wins.

32 831	**12 300**	**3 588**
9 219	**5 912**	**88 307**
12 890	**15 502**	**2 389**
30 000 + 2 000 + 800 + 30 + 1	**10 000 + 2 000 + 300**	**3 000 + 500 + 80 + 8**
9 000 + 200 + 10 + 9	**5 thousands, 9 hundreds, 1 ten and 2 ones**	**80 000 + 8 000 + 300 + 7**
10 000 + 2 000 + 800 + 90	**10 000 + 5 000 + 500 + 2**	**2 thousands, 3 hundreds, 8 tens and 9 ones**

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

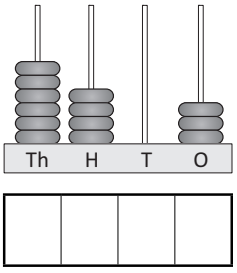
0 is worth zero or no ones

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

		Thousands	Hundreds	Tens	Ones
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.**

a



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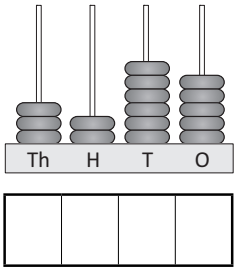
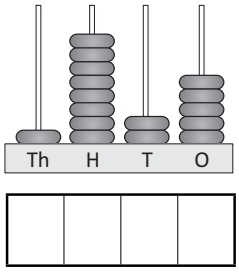


c



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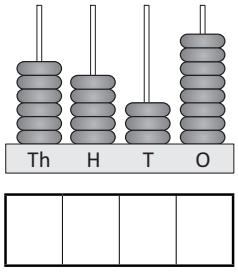
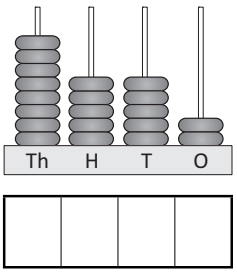


e



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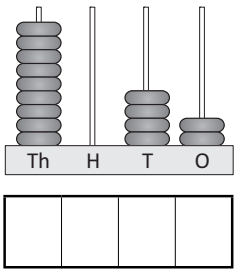
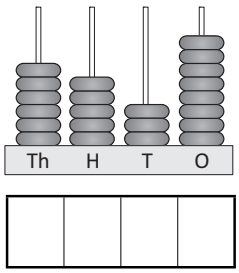


g



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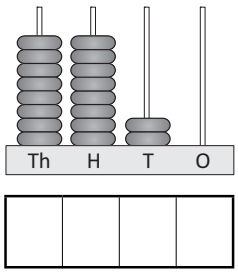


Place value of whole numbers – place value to 4 digits

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

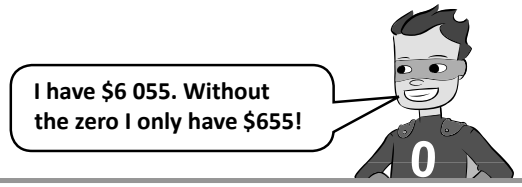
a 6 1**5**7 ☐ **b** 9 **5**44 ☐ **c** **5** 749 ☐

d 4 **5**46 ☐ **e** 78**5** ☐ **f** 2 3**5**9 ☐

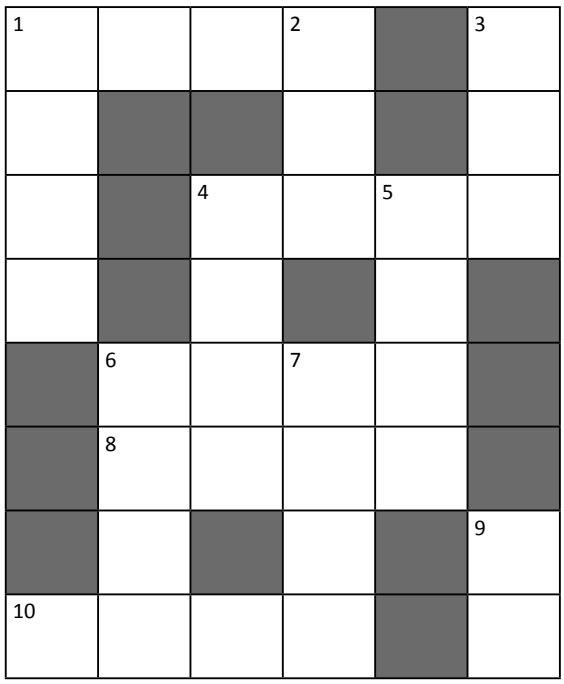
4 **Write the next 3 numbers in each sequence. The first sequence has been done for you.**

a + 100	4 600			
b + 1	768			
c + 1 000	3 590			
d – 100	9 128			

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.



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



Across

1. four thousand two hundred seven
4. seven thousand ninety four
6. two thousand five hundred sixty
8. one thousand forty seven
10. nine thousand forty three

Down

1. four thousand eighty six
2. seven hundred
3. two hundred four
4. seven thousand fifty
5. nine thousand two hundred seven
6. two thousand one hundred thirty
7. six thousand four hundred three
9. 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 ones

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.

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	Ones
45 168		4	5	1	6	8
			5	4	9	4
	1	0	0	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 4**9** 157 *9 000*

b 9 54**4** _____

c 8**5** 749 _____

d **4**7 849 _____

e 12 **4**68 _____

f 4 6**8**8 _____

g 1**3**4 _____

h 9**4** 115 _____

i **9**4 913 _____

3 **True or False?**

a In the number 67 923, the 7 has the value of 7 000. _____

b In the number 89 471, the 8 has the value of 80 000. _____

c In the number 70 532, the zero holds the value of the thousands place. _____

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 ones 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 5 digits.

If you add a one to me I have 6 digits.

What number am I?

I am _____

I am one half of ten thousand 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 ones place is the smallest even number.

My middle digit is one more than the ones digit.

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

What number am I ?

I am _____

Write a problem for a partner to solve:

Place value mastermind

apply

Getting ready

In this game, the objective is to guess a secret 4 digit number. You play with a partner.

You'll need to rule up a page with headings like this:

Number Guess	Number of Correct Digits	Digits in the Correct Place
5 738	2	1

What to do

1. Player 1 writes a secret 4 digit number on a scrap of paper.
2. Player 2 writes their guess in the Number Guess column.
3. Player 1 writes down how many correct digits there are, and how many are in the right column.
4. Player 2 uses that information for guess number 2.
5. The game continues until the secret number is revealed.
6. Swap roles.

What to do next

What strategies can you use to reduce the number of guesses you need to make?

If you reduced the number of digits in the number to 2 or 3, does it make easier to guess?

Can you work out how many 2 digit number possibilities there are?

What about 3 digit number possibilities?

Talk to other pairs. What strategies did they use?

Try them out if you think they will help you!

THINK

Who am I? solve

Getting ready

In this guessing game there are many clues. Your job is to not only guess the secret number, but to identify which clues are needed and which are true but don't help solve the problem.

What to do

Use the clues and the hundreds chart to help you identify the secret number:

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

The number is greater than 8.

The number is less than 500.

The number is not a multiple of 5.

The number is a multiple of 6.

The number is even.

Its tens digit is even and is double its ones digit.

The number is in the top half of the hundreds chart.

What is the number? ☐

What to do next

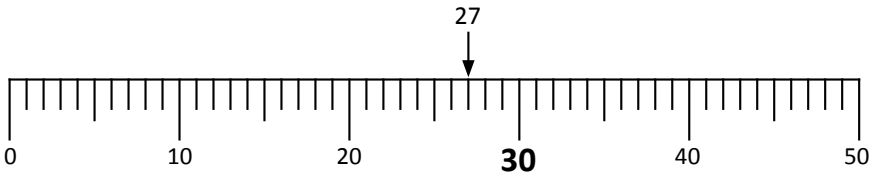
Which clues were not needed? Explain:

Round and estimate – round

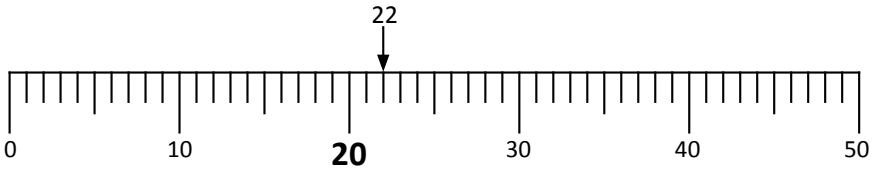
Rounding makes big numbers easier to work with. We round up if the number is exactly halfway between the 10s or over the halfway mark. We round down if the number is under the halfway mark.

Rounding to the nearest 10

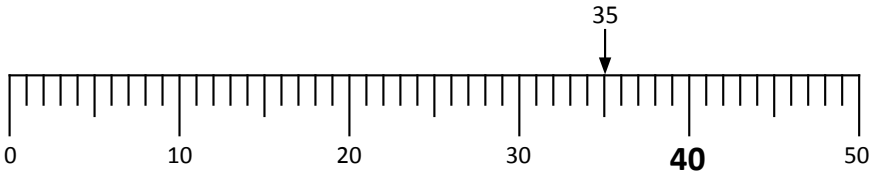
27 is over halfway between the 10s, so it rounds up to 30.



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

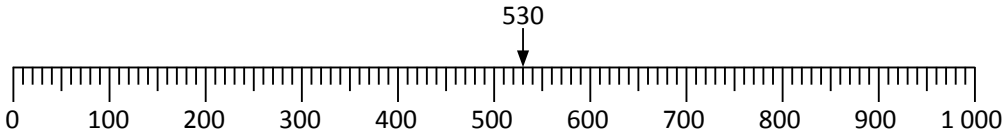


35 is exactly halfway between the 10s, so it rounds up to 40.

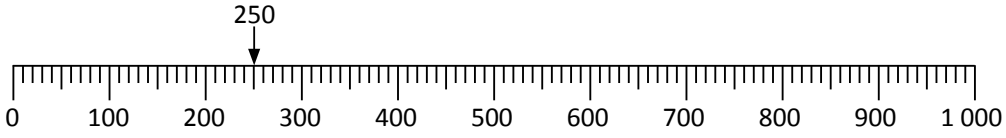


1 **Round the following numbers to the closest hundred. Find the halfway mark first.**

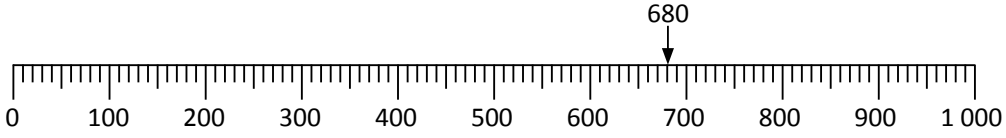
a



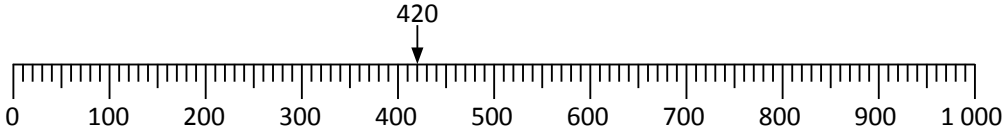
b



c

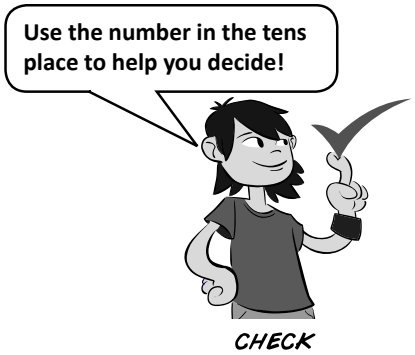


d



Round and estimate – round

2 **Round the following numbers to the closest hundred:**



a 235 ☐ **b** 680 ☐

c 513 ☐ **d** 450 ☐

e 5 164 ☐ **f** 3 748 ☐

3 **Round the following numbers to the closest thousand:**

a 942 ☐ **b** 4 964 ☐

c 2 435 ☐ **d** 9 350 ☐

e 5 678 ☐ **f** 2 845 ☐

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.**

		S							S
30	10	400	40 000	20	40	1 000	10	100	400

70	80	100	7 000	100	80

500	200	40	50	900	80	100	1 100	1 000	10

					S
30 000	900	20	50	1 000	400

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 = ☐. Time how long it takes you or a partner 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		

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

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 ☐

b 27 + 58 > 70 ☐

c 899 – 378 < 600 ☐

d 571 – 22 > 500 ☐

e 245 + 245 > 500 ☐

f 1 005 + 790 > 2 000 ☐

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, french fries 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	$2.50
Sausage roll	$2.00
Hot dog	$3.80
Jam donuts	3 for $2.00
French fries	$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

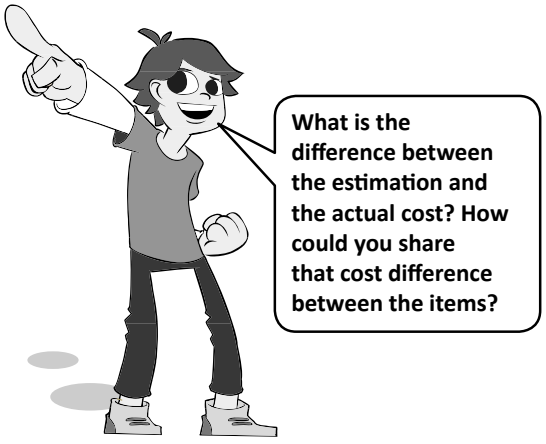
2 **In these problems, work backwards from an estimated answer to find the possible starting points.**

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.

_____



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 partner to check the reasonableness of your estimations, then use a calculator to solve the problems. You can check the thinking of two students at once.**

	Estimate	Calculation
a 23 × 5		
b 47 × 6		
c 33 × 8		
d 11 × 19		
e 97 × 3		
f 201 × 4		
g 498 × 3		

_____
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	
per hour	
per day	

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

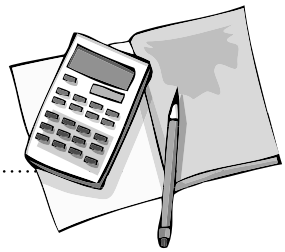
c What about in a year?

Round and estimate challenges

solve

Getting ready

Solve these problems using your head, a calculator, a pen and paper. You may work with a partner.



What to do

a You have won $5 487 in a competition. The organisers have no coins and have to round off the amount so they can give you your winnings in notes. Would you rather they rounded to the nearest $10, $100 or $1 000? Why? How much money would you get in each case?

b I am now 156 000. I have been rounded to the nearest thousand. List at least 5 numbers I could have been.

c I am now 145 200 after being rounded to the nearest hundred. List at least 5 numbers I could have been.

d I am 16 000. What two whole numbers can be multiplied together to make me? How many pairs of numbers can you come up with?

Shop till you drop

apply

Getting ready

You and a partner will take turns going on 60 second shopping sprees. You'll need a copy of this page, a timer or a clock with a second hand, the items below and your best estimation skills. You may also want to use a calculator for checking.

copy

What to do

1 Cut out the items below.

2 Decide who will be the first shopper and who will be the timer.

3 The timer states a spending limit between the values of $10 and $50.

4 The shopper then has 60 seconds to estimate what they can buy while staying under the limit. The shopper takes the items they want. It is okay to put things back. (If 60 seconds is too hard, make the time limit 2 minutes.)

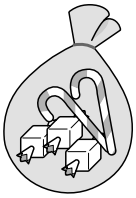
5 After the time is up, all transactions stop. Add up the purchases, using a calculator if desired.

6 If the shopper has stayed under the limit, they get a point. If they go over the limit, they get nothing.

7 Swap roles. At the end of that round, the person who was closest to their shopping limit gets a bonus point.

What to do next

Make up some more items for the shopping spree. Or challenge another team to a race.

 $14.98	 $18.98	 $9.99	 $2.95	 $1.95
 $12	 $3.22	 $4.99	 $29.95	 $7.95