

NUMBER SENSE



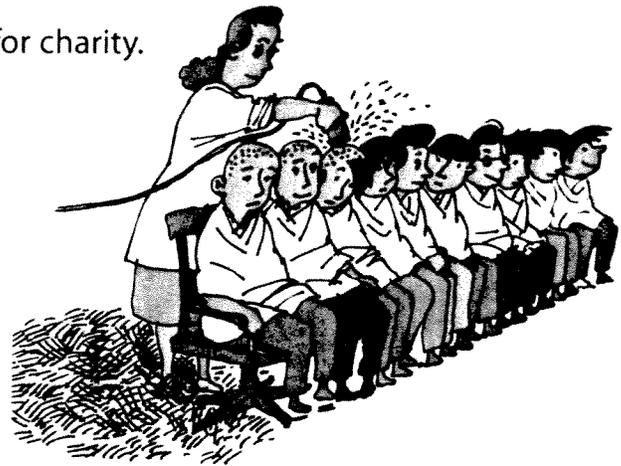
LARGE NUMBERS

Estimating Large Quantities:

1. How many grains of rice would fill a 1 litre container? _____
2. How many classrooms would be needed for 100, 000 people to stand comfortably? _____
3. If you had a \$100, 000, how would you spend the money? _____
4. How many students would fit comfortably on 100 school busses? _____
5. How many people live in Winnipeg? _____
6. How many people live in Manitoba? _____
7. How many people live in Canada? _____

Exploring One Million

These people are having their heads shaved for charity. Brown-haired people have about 100 000 hairs on their heads. About how many people do you think would have to be shaved to collect 1 million hairs?



You can use patterns to learn about 1 million.

Words	One Million	One Hundred Thousand	Ten Thousand	One Thousand	One Hundred	Ten	One
Numbers	1 000 000	100 000	10 000	1000	100	10	1
Base Ten Block	?	?	?				

Look at the chart above.

- What do you think:
 - the 10 000 block would look like?
 - the 100 000 block would look like?
 - the 1 000 000 block would look like?
- Sketch each block.

How do the lengths, widths, and heights of the blocks compare?
What patterns do you see?
- In the chart, what patterns do you see in the numbers?

Show and Share

Share the patterns you found with another pair of students.
How do the patterns in the chart compare with the patterns
in your sketches of the blocks?

Challenge

One million is a very large number.
You can visualize 1 million by imagining
a model of a cubic metre.
To fill the cube, you would need
1 million Base Ten unit cubes
or 1000 thousand cubes.

Here are some benchmarks to help
you think about the number 1 million.

- 1 000 000 = 1000 thousands
- \$1 000 000 = ten thousand \$100 bills
- 1 000 000 min is about 2 years.
- 1 000 000¢ = \$10 000



Practice

Use a calculator when it helps.

1. Have you lived one million hours?
If your answer is no, have you lived one million minutes?
Explain your thinking.
2. Suppose you use a calculator to count to 1 000 000.
How many times will you press the "equals" key if you:
 - a) count by 1000s?
 - b) count by 10 000s?
 - c) count by 100 000s?Use a calculator to check.
3. How many \$10 bills would it take to make \$1 million?



4. How long would a line of 1 million centimetre cubes be?
Give your answer using as many different units as you can.

5. How many days would it take you to spend \$1 000 000, if each day you spend:

- a) \$100 000? b) \$50 000? c) \$10 000?
d) \$1000? e) \$500? f) \$100?

6. Suppose you save \$100 a month. How many months would it take until you could trade your savings for 1 million pennies?

7. There are 100 pennies in one roll. How many pennies are there in

- a) 5 rolls? b) 10 rolls?
c) 50 rolls? d) 100 rolls?
e) 500 rolls? f) 1000 rolls?



8. How many rolls of pennies do you need, to have one million pennies?

9. Copy and complete.

- a) $999\,999 - 1 = \square$
b) $1\,000\,000 - 100\,000 = \square$
c) $800\,000 + \square = 1\,000\,000$
d) $500\,000 \times \square = 1\,000\,000$
e) $250\,000 \times \square = 1\,000\,000$
f) $1\,000\,000 \div 10 = \square$

10. Measure a straw to the nearest centimetre. Suppose 1 million straws were laid end-to-end. How far would they stretch? How many different ways can you find out?



Reflect

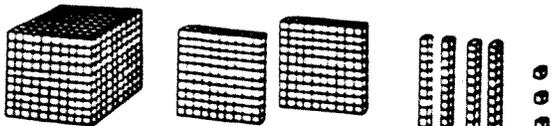
What do you know about one million?

Use newspapers and catalogues. Find items that you could buy to total \$1 million. Interview a senior or elder. Find out what could have been purchased with \$1 million fifty years ago. List the items.

Name _____

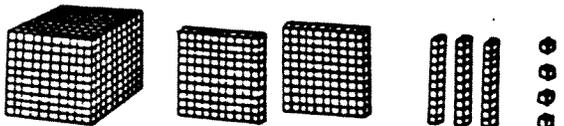
Basic Worksheet 1

Match.



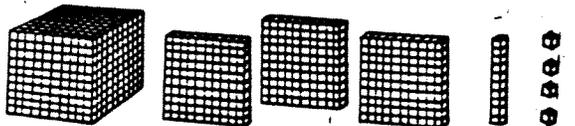
• 1234 •

• one thousand
two hundred forty-three



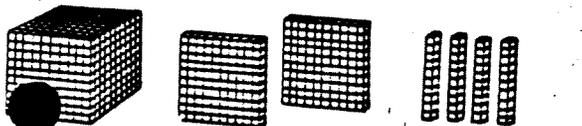
• 1314 •

• one thousand
two hundred four



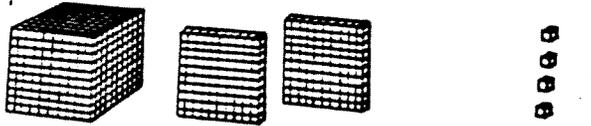
• 1243 •

• one thousand
two hundred thirty-four



• 1204 •

• one thousand
three hundred fourteen



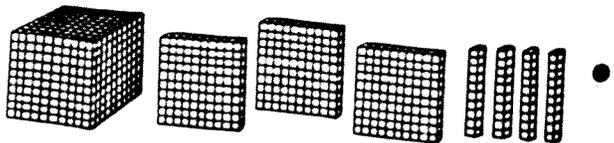
• 1240 •

• one thousand
three hundred forty



• 1134 •

• one thousand
twenty-four



• 1340 •

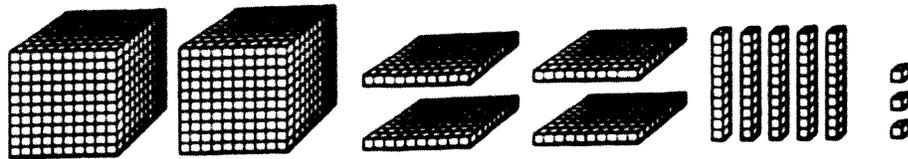
• one thousand
two hundred forty



• 1024 •

• one thousand
one hundred thirty-four

Write the number shown in this diagram 3 different ways.



Think: 2 thousands 4 hundreds 5 tens 3 ones

Write in words: two thousand four hundred fifty-three

Write the number: 2453

Write in expanded form: $2000 + 400 + 50 + 3$

Write in words.

1. 3458 _____
2. 6205 _____
3. 8286 _____
4. 1018 _____

Write in numerals.

5. four thousand eighty-two _____
6. nine hundred fifty-four _____
7. six hundred forty-nine _____
8. one thousand five hundred one _____
9. seven thousand eight hundred twenty-nine _____

Write in expanded form.

10. 2134 _____
11. 1977 _____
12. 5806 _____
13. 7300 _____

Writing Numbers

Name: _____ Date: _____

1.) Write the Following Numbers in Words

12 345

159 673

799 005

2.) Write the Following in Numbers

a. nine hundred three thousand seven hundred thirty two

b. one hundred thousand sixty five

c. eight hundred thousand five hundred ninety nine

d. three hundred eighty seven thousand six hundred seventeen

3.) Create your own Number

Take the number below and reorder it to create a new number of your own.

546 723

My new number is: _____

My number is words is:

4.) Underline the Place Value

- | | |
|----------------------|---------|
| a. Hundreds | 52 674 |
| b. Ten thousands | 368 972 |
| c. Ones | 597 642 |
| d. Hundred thousands | 697 281 |
| e. Tens | 97 350 |
| f. Thousands | 101 485 |

5.) Describe one strategy you use to help you figure out place value.

Name _____ Date _____



N umbers to 10 000 (2)

Write each numeral in words.

1. 7215 _____

2. 8024 _____

3. 9006 _____

Write the numeral for each number.

4. six hundred seventy _____

5. five thousand six hundred two _____

6. two thousand twenty-two _____

Write each number in standard form.

7. $7000 + 900 + 4$ _____

8. $3000 + 80$ _____

9. $1000 + 500 + 60 + 3$ _____

10. $8000 + 20 + 5$ _____

Write in order from least to greatest.

11. 4653, 4536, 4365, 4635
_____, _____, _____, _____

12. 4002, 4200, 4020, 4202
_____, _____, _____, _____

13. 7091, 971, 9701, 7901
_____, _____, _____, _____

Name _____ Date _____

PRACTICE

Numbers to 100 000 (1)

Write the number that is:

1. 500 more than 10 000 _____
2. 1000 less than 10 000 _____
3. 1000 more than 9900 _____
4. 100 less than 70 000 _____
5. one thousand more than 19 836 _____
6. ten thousand less than 48 509 _____
7. one more than 99 999 _____
8. ten less than 6307 _____
9. ten thousand more than 45 107 _____
10. between 99 000 and 98 998 _____
11. between 10 001 and 9999 _____
12. ten thousand less than 100 000 _____
13. between 99 998 and 100 000 _____
14. Round each number to the nearest thousand.
8372 _____ 23 509 _____
15. Round each number to the nearest ten thousand.
47 760 _____ 30 891 _____
16. Write three numbers that total 100 000.

© Addison-Wesley Publishers Limited

Name _____ Date _____

PRACTICE

Numbers to 100 000 (2)

Write each numeral in words.

1. 50 819 _____
2. 33 070 _____
3. 16 508 _____

Write the numeral for each number.

4. fifty-six thousand eighty-one _____
5. thirty thousand seven hundred five _____
6. ninety-four thousand six _____

Write each number in standard form.

7. $80\ 000 + 9\ 000 + 200 + 4$ _____
8. $50\ 000 + 4\ 000 + 10$ _____
9. $10\ 000 + 1\ 000 + 800 + 60 + 2$ _____
10. $40\ 000 + 700 + 3$ _____

What number could this be?

11. • It is between 100 000 and 300 000.
 - Three of its digits are even numbers. The rest are zeros.
 - The ten-thousands digit is double the hundred-thousands digit.
 - The thousands digit is double the ten-thousands digit. _____
12. • It is greater than 700 000.
 - The sum of all its digits is 14.
 - It has no zeros.
 - The hundreds digit is 3. _____

© Addison-Wesley Publishers Limited

Name _____ Date _____

PRACTICE

Numbers to 999 999 (1)

Write the number that is:

1. after 9999 _____
2. before 100 000 _____
3. nine thousand more than 900 900 _____
4. one thousand less than 70 000 _____
5. ten thousand more than 8472 _____
6. one thousand less than 100 793 _____
7. one hundred more than 99 990 _____
8. 1 hundred thousand less than 715 102 _____
9. 2 hundred thousands more than 256 795 _____
10. between 98 999 and 99 001 _____
11. 3 ten thousands less than 90 406 _____
12. 1 ten thousand less than 10 000 _____
13. after 999 999 _____
14. Write two 6-digit numbers. One must be exactly fifty-four thousand less than the other.

15. Write two 6-digit numbers. One must be exactly one hundred thousand one hundred more than the other.

16. Write three numbers that total 1 000 000.

Name _____ Date _____

PRACTICE

Numbers to 999 999 (2)

Write each numeral in words.

1. 670 914 _____
2. 502 043 _____
3. 199 001 _____

Write the numeral for each number.

4. six hundred thousand one hundred five
5. three hundred ten thousand twenty
6. eight hundred forty thousand six hundred

Use the number in the box.

739 402

Write the digit that is in the place named.

- | | | |
|--------------------|--------------------|-----------------------------|
| 7. thousands _____ | 8. tens _____ | 9. ten thousands _____ |
| 10. ones _____ | 11. hundreds _____ | 12. hundred thousands _____ |

Write in order from least to greatest.

13. 110 193, 101 319, 111 913, 110 391
_____, _____, _____, _____
14. 523 191, 352 876, 532 048, 253 951
_____, _____, _____, _____
15. 609 932, 689 214, 688 975, 698 023
_____, _____, _____, _____

The place value chart shows the number 371 428.

Thousands					
H	T	O	H	T	O
3	7	1	4	2	8

371 428

The value of the 3 is 300 000.

The value of the 7 is 70 000.

The value of the 1 is 1 000.

The value of the 4 is 400.

The value of the 2 is 20.

The value of the 8 is 8.

Circle all the names for the underlined digit.

1. 20 286 200 6 hundreds two hundred

2. 947 852 90 000 9 hundred thousands nine hundred thousand

Complete the names for the underlined digit.

3. 63 296

_____ ten thousands

_____ thousand

4. 487 310

_____ thousands

_____ thousand

Write zeros to complete the sentence.

5. The value of 8 in 67 832 is 8 _____.

6. The value of 3 in 234 788 is 3 _____.

7. The value of 6 in 634 782 100 is 6 _____.

Write the value of the underlined digit.

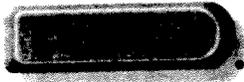
8. 78 299 _____ 9. 64 811 _____ 10. 628 501 _____

11. 30 752 _____ 12. 842 905 _____ 13. 933 284 _____

Copyright © 1988 Addison-Wesley Publishers Ltd.

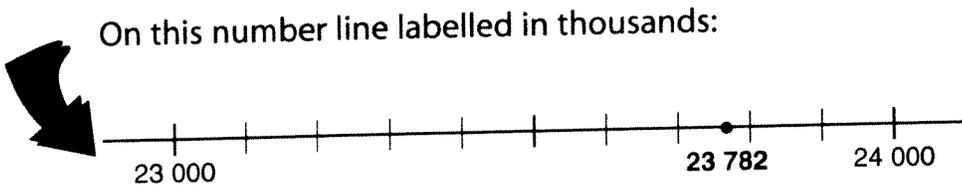
Show and Share

Compare the numbers you wrote with those of another pair of classmates.
Talk about how you placed the numbers on the number lines.
Share the strategies you used.

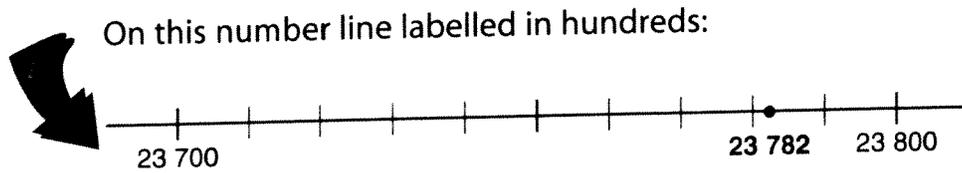


There were 23 782 people at a lacrosse game.
The number 23 782 is exact.
It is a count of the number of people.
To write an estimate for the number of people,
you can find the closest benchmark.

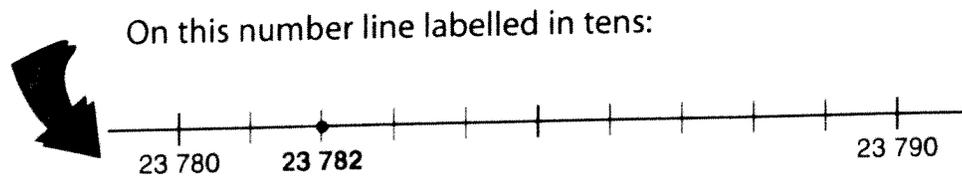
It is easier
to remember 24 000
than to remember 23 782.



23 782 is between 23 000 and 24 000.
It is closer to 24 000.
An estimate for 23 782 is 24 000.



23 782 is between 23 700 and 23 800.
It is closer to 23 800.
A closer estimate for 23 782 is 23 800.



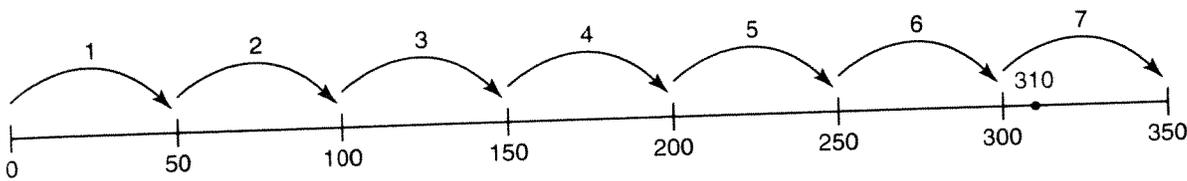
23 782 is between 23 780 and 23 790.
It is closer to 23 780.
An even closer estimate for 23 782 is 23 780.



Sometimes it is important to overestimate.

There are 310 people going to the zoo.
Each school bus holds 50 people.
How many school buses should be ordered?

310 is closest to the benchmark 300.
We would need 6 school buses for 300 children.
But, 10 people would have to stay behind.
It makes sense to overestimate 310 to 350.
Then, we would order 7 school buses.



Practice

Use a number line when it helps.

1. The longest country line dance had 6275 people.
What is the closest benchmark in thousands?
2. Ms. Carr is buying granola bars for her choir.
There are 72 students in the choir.
Granola bars come in boxes of 10.
How many boxes should Ms. Carr buy?
Explain.
3. Estimate to the closest thousand.
How did you get each answer?
a) 2376 b) 47 891 c) 86 300
d) 4735 e) 1999 f) 3087
4. Estimate to the closest hundred.
a) 9876 b) 41 509 c) 53 055
d) 1749 e) 5465 f) 8230
5. Estimate to the closest ten. How did you get each answer?
a) 2347 b) 6708 c) 78 973 d) 7597



Name _____ Date _____

Correct the math test below. If an answer is wrong, draw a line through it and write the correct answer next to it.

Bob Wright

Math Test

1. one thousand seventy-four 100 074
2. $9000 + 600 + 50 + 3$ 9653
3. six thousand five hundred 60 500
4. seven thousand three hundred fifty 7305
5. four thousand nine hundred fifteen 40 915
6. $200.000 + 6000 + 900 + 40 + 7$ 206 947
7. five hundred four thousand 5040
8. twenty-three thousand sixty-two 23 062
9. $20.000 + 6000 + 700 + 9$ 26 709
10. eighty thousand forty-four 8044
11. $60.000 + 400 + 20 + 4$ 6426
12. four thousand thirty-six 4036
13. seven hundred sixty-six thousand 706 066
14. nine thousand eight 9008
15. $500.000 + 60.000 - 200 + 4$ 562 004 _____ correct

Restricted Area!
For Mathematicians ONLY

If each correct answer is worth 10 points,
how many points did Bob receive?

NAME _____

Comparing and Ordering Numbers

Which is greater, 218 324 or 218 295?

Compare each digit.

hundred thousands	ten thousands	thousands	hundreds	tens	ones
2	1	8	3	2	4
2	1	8	2	9	5

↓ same
↓ same
↓ same
↓ 3 hundreds > 2 hundreds
so, 218 324 > 218 295

Write >, <, or = to make true statements.

- | | |
|---|---|
| <p>1. 51 248 _____ 51 268</p> <p>3. 998 765 _____ 998 765</p> <p>5. 453 986 _____ 453 968</p> <p>7. 719 057 _____ 719 056</p> | <p>2. 81 020 _____ 81 200</p> <p>4. 400 102 _____ 400 010</p> <p>6. 312 406 _____ 321 406</p> <p>8. 460 001 _____ 460 011</p> |
|---|---|

Calling All Mathematicians

Using the numbers 1 to 8, rank the cities in order from greatest to least, according to the number of telephones in each.



NAME _____

Rounding

Round 475 283 to the nearest thousand, ten thousand, and hundred thousand.

Round to the nearest	What is the digit to the right of the rounding place?	Is the digit 5 or greater?	Round
thousand	2	no	down to 475 000
ten thousand	5	yes	up to 480 000
hundred thousand	7	yes	up to 500 000

Complete the chart. Round to the nearest thousand, ten thousand, and hundred thousand.

	thousand	ten thousand	hundred thousand
1. 123 467			
2. 565 070			
3. 194 513			
4. 608 924			
5. 889 756			

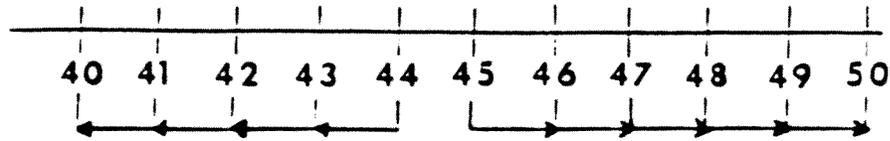
Find the Hidden Number.

Round each number written in hundreds to the nearest hundred.
 Round each number written in thousands to the nearest thousand.
 Shade all squares whose numbers round to 700.
 Shade all squares whose numbers round to 4000.

701	403	716	3800	3975	4516	4416
4200	821	689	822	702	804	4316
699	758	3986	651	650	1921	651

The hidden number is _____.

Rounding



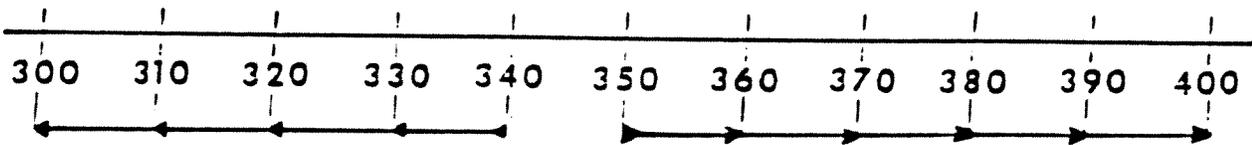
Rounding to the nearest 10.

All numbers ending in 4 or less than 4 round to the lower 10.

All numbers ending in 5 or more than 5 round to the higher 10.

1. Round these numbers to the nearest 10.

- | | | | | | |
|----------------|----------------|----------------|------------|------------|------------|
| (a) | (b) | (c) | (d) | (e) | (f) |
| 46 → <u>50</u> | 42 → <u>40</u> | 45 → <u>50</u> | 92 → ___ | 97 → ___ | 95 → ___ |
| (g) | (h) | (i) | (j) | (k) | (l) |
| 132 → ___ | 401 → ___ | 628 → ___ | 457 → ___ | 972 → ___ | 146 → ___ |
| (m) | (n) | (o) | (p) | (q) | (r) |
| 352 → ___ | 187 → ___ | 256 → ___ | 189 → ___ | 221 → ___ | 355 → ___ |
| (s) | (t) | (u) | (v) | (w) | (x) |
| 6742 → ___ | 9876 → ___ | 1341 → ___ | 7659 → ___ | 2486 → ___ | 1301 → ___ |



Rounding to the nearest 100.

All numbers ending in less than 50 round to the lower 100.

All numbers ending in 50 or more round to the higher 100.

2. Round these numbers to the nearest 100.

- | | | | | | |
|------------------|------------------|------------------|------------|------------|------------|
| (a) | (b) | (c) | (d) | (e) | (f) |
| 620 → <u>600</u> | 687 → <u>700</u> | 650 → <u>700</u> | 230 → ___ | 270 → ___ | 250 → ___ |
| (g) | (h) | (i) | (j) | (k) | (l) |
| 356 → ___ | 429 → ___ | 874 → ___ | 329 → ___ | 164 → ___ | 592 → ___ |
| (m) | (n) | (o) | (p) | (q) | (r) |
| 1842 → ___ | 3964 → ___ | 2006 → ___ | 1374 → ___ | 1210 → ___ | 7649 → ___ |

ROUNDING TO THE NEAREST THOUSAND !!

When rounding to the nearest thousand look at the digit in the hundreds place.

If the hundreds digit is 4 or less, you round to the nearest thousand lower.

If the hundreds digit is 5 or more, you round to the next highest thousand.

Examples.

9 462	rounded to the nearest thousand is	9 000
12 768	rounded to the nearest thousand is	13 000
27 542	rounded to the nearest thousand is	28 000

1. Round each number to the nearest thousand.

- | | | |
|----------------|------------------|-------------------|
| (a) 3362 _____ | (e) 19 273 _____ | (i) 213 046 _____ |
| (b) 4795 _____ | (f) 45 568 _____ | (j) 324 811 _____ |
| (c) 8627 _____ | (g) 76 401 _____ | (k) 199 137 _____ |
| (d) 976 _____ | (h) 12 940 _____ | (l) 406 705 _____ |

2. The school library has 1768 non-fiction books and 3274 fiction books. Find the total number of books to the nearest thousand.
_____ books
3. During a charity drive Company A donated \$3850 and Company B donated \$2050. What was the difference in their contributions to the nearest thousand?
\$ _____
4. At the football game there were 27 406 men, 12 843 women and 941 children. Find the total attendance to the nearest thousand.
_____ people
5. Round each number to the nearest thousand and then find the average. 12 345, 6504, 7642

Name _____

Basic Worksheet 3

Complete.

	Number	Rounded to the nearest ten	Rounded to the nearest hundred	Rounded to the nearest thousand	Rounded to the nearest ten thousand
1.	45 831	45 830	45 800	46 000	50 000
2.	74 356				
3.	59 405				
4.	96 478				
5.	52 017				
6.	824 561				
7.	750 362				
8.	340 997				
9.	824 125				
10.	545 654				
11.	417 089				
12.	525 316				
13.	813 099				
14.	994 817				

Name _____ Date _____

TEST

Unit 2 (Representing Numbers)

Test 1

Test 1

Write the numeral for each number.

1. six thousand eighty-three _____

2. four hundred one thousand seven _____

3. fifty thousand sixteen _____

4. $30\,000 + 900 + 5$ _____

5. $700\,000 + 2000 + 600$ _____

Write each numeral in words.

6. 3408 _____

7. 50 023 _____

8. 802 700 _____

9. 600 016 _____

Name the value of each underlined digit.

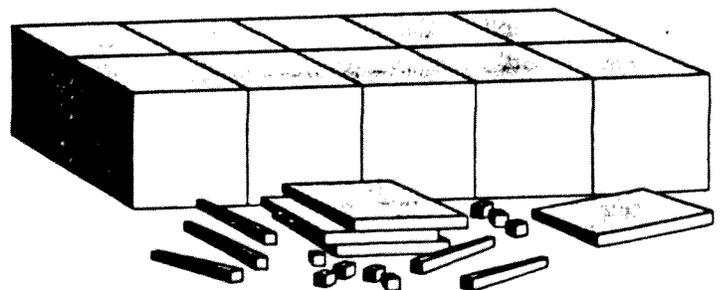
10. 47 309 _____

11. 385 602 _____

12. 624 871 _____

13. 450 123 _____

14. Examine the picture of the base ten blocks. Estimate the number they represent.



Name _____ Date _____

TEST

Unit 2 (Representing Numbers)

Test 2

Write the number that is:

1. 400 less than 2300 _____
2. 500 more than 5000 _____
3. 1000 less than 10 000 _____
4. ten thousand more than 52 718 _____
5. one more than 99 999 _____
6. one hundred less than 67 022 _____
7. three ten thousands less than 96 410 _____

Record the greater number in each pair.

8. 2039 or 2301 _____
9. 62 247 or 9999 _____

Write each set of numbers in order from least to greatest.

10. 52 109, 51 290, 29 519, 51 902
_____, _____, _____, _____
11. 8989, 9898, 11 229, 10 982
_____, _____, _____, _____
12. 637 120, 763 120, 376 210, 673 012
_____, _____, _____, _____

Round each number to the nearest thousand.

13. 24 519 _____
14. 6498 _____

Round each number to the nearest ten thousand.

15. 56 285 _____
16. 137 059 _____

4

Estimating Sums

Some problems do not need an exact answer. Sometimes you can estimate a sum.

How do you know if \$1000 is enough money to buy the TV and the DVD player?

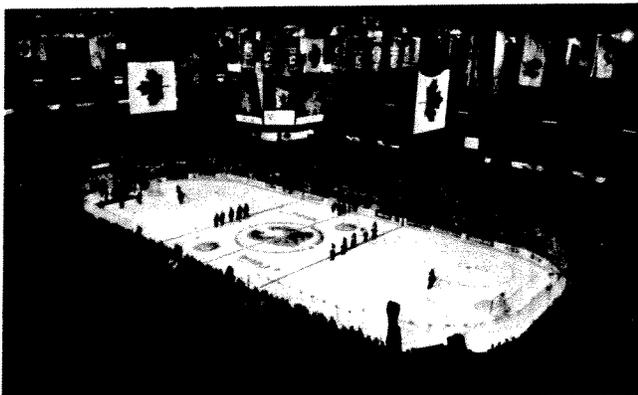


Do you need to add the prices of the items or can you estimate to find out? Explain your answer.



This chart shows the seating capacity of each NHL Canadian team's home arena.

Team	Seats
Calgary Flames	20 140
Edmonton Oilers	17 100
Montreal Canadiens	21 273
Ottawa Senators	20 004
Toronto Maple Leafs	18 819
Vancouver Canucks	18 630



- Suppose a game was sold out in Vancouver and in Calgary. About how many people attended these two games?
- The NHL ordered 35 000 pennants to give away for the opening Leafs and Oilers games. The games were sold out. Will there be a pennant for everyone? Explain how you know.

Show and Share

Compare your estimates with those of another pair of classmates.

What strategies did you use to estimate?

When is it better to estimate using a greater number than the given number?

- Lori-Ann Muenzer of Edmonton participated in the 2004 Athens Olympic Games. She won Canada's first ever gold medal in cycling.

Lori-Ann was one of 11 090 athletes at the 2004 Athens Olympic Games.
There were 10 651 athletes at the 2000 Sydney Olympic Games.
About how many athletes attended both Olympic Games?

You know that an exact answer is not required because the question asks "about how many."

Estimate: $11\ 090 + 10\ 651$



- One strategy is to use the front digits to estimate. This strategy is called **front-end rounding**.

Add the first digits of the numbers:

$$11\ 090 + 10\ 651 \text{ is about } 10\ 000 + 10\ 000 = 20\ 000$$

Then adjust the front-end estimate by looking at the first two digits in each number:

$$11\ 090 + 10\ 651 \text{ is about } 11\ 000 + 10\ 000 = 21\ 000$$

Using the first two digits gets you closer to the exact answer.

There were about 21 000 athletes at the two games.

- Another strategy is to use **compatible numbers** to estimate. Compatible numbers are pairs of numbers that are easy to work with. For example, multiples of 10 are compatible numbers. To estimate, replace the actual numbers with numbers that are compatible:
Write: $11\ 090 + 10\ 651$
as: $11\ 100 + 10\ 650 = 21\ 750$
There were about 21 750 athletes at the two games.

Front-end rounding always gives an *underestimate*.

Compatible numbers may give an underestimate or an overestimate. It depends on the numbers you use.

In some situations, I want to overestimate. When I shop, I want to know that I have more than enough money!



- You can use front-end rounding when you estimate the sum of more than two numbers. You can also use front-end rounding if the numbers have different numbers of digits.

Here are data for five Summer Olympic Games.

Olympic Games	Number of Athletes
Athens, 2004	11 090
Sydney, 2000	10 651
Atlanta, 1996	10 320
Barcelona, 1992	9 956
Seoul, 1988	8 465

When there are 4-digit and 5-digit numbers in a column, we align the digits. So, the 4-digit numbers have a space between digits too.

About how many athletes were at the five games?

Use front-end rounding to find out:

$11\ 090 + 10\ 651 + 10\ 320 + 9956 + 8465$ is about
 $10\ 000 + 10\ 000 + 10\ 000 + 9000 + 8000 = 47\ 000$
 There were about 47 000 athletes at the five games.

We can adjust the estimate by using **compensation**.

$11\ 090 + 10\ 651 + 10\ 320 + 9956 + 8465$
 ↓ ↓ ↓ ↓ ↓
 $11\ 000 + 11\ 000 + 10\ 000 + 10\ 000 + 8000 = 50\ 000$
 ↓ ↓ ↓ ↓ ↓
 round round round round round
 down up down up or down

If we round one number down, we round the next number up.

When we estimate then compensate, the estimate is closer to the exact value. There were about 50 000 athletes at the five games.

Practice

1. Use the numbers in the box.
Find pairs of numbers with each sum.

- a) 50 b) 60
c) 70 d) 80

10	15	20	25
30	35	40	45
50	55	60	65

2. Some compatible numbers have a sum that is a multiple of 10.
Use your answers to question 1 to list pairs of compatible numbers.

3. Use the numbers in the box.
a) Find pairs of numbers with a sum that is a multiple of 100.
b) Why are the numbers compatible in each pair you listed in part a?

110	230	290	320
460	470	540	650
660	740	820	850

4. Estimate each sum. Explain your strategy.

- a) $6145 + 3007$ b) $3654 + 372$ c) $500 + 2150$
d) $1999 + 999$ e) $4003 + 2968$ f) $7741 + 685$

5. Estimate to find the sums less than 10 000.

- a) $3099 + 5824$ b) $6489 + 3201$ c) $4673 + 6595$
d) $9997 + 8743$ e) $5063 + 297$ f) $9539 + 470$

6. Estimate: $32\,756 + 16\,345$

- a) Do you think the exact answer will be less than or greater than your estimate?
Explain your thinking.
b) How could you use compensation to improve your estimate?

7. The school held a magazine drive.

The junior classes raised \$15 875.

The intermediate classes raised \$19 256.

- a) Did the students beat last year's record of \$34 200? Explain.
b) How could you use compatible numbers to estimate?

8. Use these numbers: 5245, 6020, 7985, 6755, 4850

Estimate to find which 2 numbers have the sum closest to:

- a) 10 000 b) 15 500

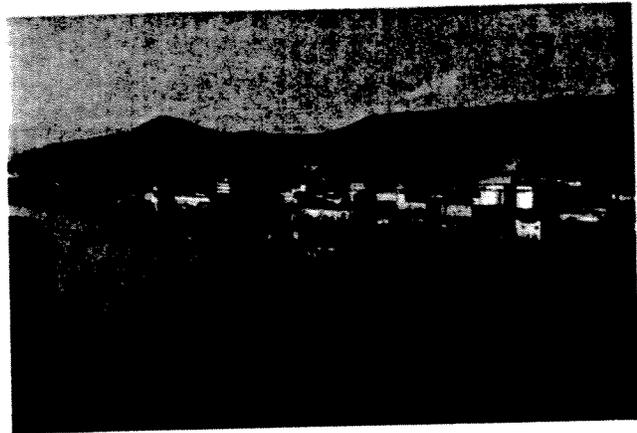
Which estimation strategies did you use?

9. Write a story problem where you do not need to find an exact answer to solve the problem.

Explain why estimating the sum is a reasonable strategy.

10. These data show how the population of the Yukon Territory has changed over the past 50 years.

Date	Population
1961	14 600
1971	18 400
1981	23 200
1991	27 800
2001	28 700



Use these data to predict the population of Yukon in 2011.
Explain how you estimated to predict.



11. The table shows the number of tickets sold to 5 live shows at a Concert Hall.

Shows	Monday	Tuesday	Wednesday	Thursday	Friday
Tickets Sold	12 900	14 590	26 565	16 750	24 810

- About how many tickets were sold for the first two shows?
 - About how many tickets were sold on the two days when the greatest and least numbers of tickets were sold?
 - About how many tickets were sold during the week?
What strategies did you use to solve each problem?
12. At the opening baseball game, 16 254 programs were sold.
At the second game, 15 910 programs were sold.
Predict how many programs should be printed for the third and fourth games.
Explain your thinking.
13. Think of a situation where you would estimate to make a prediction.
Explain how you would estimate.

Reflect

How can you tell if your estimate is greater than or less than the exact sum?

EXPLORE



The first day the ski hills were open,
1368 lift tickets were sold.
The second day, 1155 lift tickets were sold.

About how many more tickets were sold
the first day?

Estimate to find out.

Record your answer.



Show and Share

Compare your estimate with that of another pair of students.
How did the strategies you used affect your answers? Explain.

CONNECT

Here are some students' strategies for estimating a difference.

- To estimate: $3818 - 2079$,
Alice used front-end rounding.
She subtracted the first digits of the numbers:

$$3818 - 2079 \text{ is about}$$

$$3000 - 2000 = 1000$$

$$3818 - 2079 \text{ is about } 1000.$$

For a closer estimate, Alice looked at the last 3 digits of each number.

$$818 \text{ is about } 800.$$

$$079 \text{ is about } 100.$$

$$800 - 100 = 700$$

Alice added 700 to her estimate of 1000: $1000 + 700 = 1700$

So, $3818 - 2079$ is about 1700.

3818 is closer to 4000 than
to 3000. So, using only the first
digits does not give me a
close estimate.



- To estimate: $5849 - 3097$,
Brian estimated each number to the closest 1000.
 5849 is closer to 6000 than to 5000 .
 3097 is closer to 3000 than to 4000 .
 $6000 - 3000 = 3000$
So, $5849 - 3097$ is about 3000 .

For a closer estimate, Brian estimated each number to the closest 100.
 5849 is closer to 5800 than to 5900 .
 3097 is closer to 3100 than to 3000 .
 $5800 - 3100 = 2700$
So, $5849 - 3097$ is about 2700 .

- Both Marie and Sunil used compatible numbers to estimate: $4803 - 310$
Marie said that 4803 is close to 4810 .
Then, $4810 - 310 = 4500$

Sunil said that 310 is close to 303 .
Then, $4803 - 303 = 4500$

Both students had the same estimate.
 $4803 - 310$ is about 4500 .

I changed 2 digits in the first number so both numbers have the same last 2 digits.

I changed 2 digits in the second number so both numbers have the same last 2 digits.



Practice

- Use any strategy you wish to estimate each difference.

a) $6723 - 985$	b) $7415 - 4002$	c) $6345 - 4328$
d) $8640 - 445$	e) $9876 - 1234$	f) $8025 - 980$
- Tell if you think each estimate is high or low. How do you know?
Which estimation strategy do you think was used?

a) $2593 - 1548$ is about 1000	b) $9845 - 6050$ is about 3800
c) $7520 - 807$ is about 6713	d) $6056 - 985$ is about 5000
- Use front-end rounding to estimate each difference.

a) $2593 - 1590$	b) $9705 - 562$	c) $8739 - 6326$
------------------	-----------------	------------------
- There are 8625 tickets for the concert.
Six thousand eight hundred eighty-five tickets have been sold.
About how many tickets are still for sale?

23

5. Sandi is in Room 401.
- a) Sandi estimates that her class has collected about \$1000 more than Room 403.
Is her estimate high or low? Explain.
 - b) Sandi estimates that Room 404 has collected about \$1000 more than Room 403.
How do you think she estimated?
How do you think Sandi should have estimated?
 - c) What is a good way to estimate the difference between the money collected by Room 402 and Room 403?
Why do you think so?

Magazine Sales	Money Collected
Room 401	\$2855
Room 402	\$980
Room 403	\$1900
Room 404	\$2595

6. Two 4-digit numbers have a difference of about 3500. What might the numbers be? How do you know?
7. *Census at School* is a website where students answer surveys and collect data. The table shows the numbers of students in Canada who answered surveys in the past few years.

Year	2003/04	2004/05	2005/06
Number of Students	7683	22 643	31 960

Predict how many students will answer surveys on the site in 2006/07.
Explain how you estimated to predict.

8. Describe a situation when you would estimate a difference rather than find the exact answer to a subtraction problem.
Explain why an estimate is appropriate.

Math Link

Your World

Jeanne Louise Calment of France was the oldest woman ever. She lived from 1875 to 1997.
About how many years did she live?



Reflect

How do you decide which estimation strategy to use when you subtract? Use words and numbers to explain.

WILLAC S TITQ LITUWERK :

	thousands	thousands	thousands	hundreds	tens	ones	write out the number
Round 1							
Round 2							
Round 3							
Round 4							
Round 5							
Round 6							
Round 7							
Round 8							

Estimating Quantities (1)

Emma, André, and Sophie wondered what one million things would look like. They decided to find out how much space one million things would take up on their classroom floor. They measured the room and found that the area was 70 m².

1. They measured one square metre of the floor. Then they covered it with a single layer of shoes. There were 41 shoes.

About how many shoes would it take to cover the classroom floor?

1000 3000 10 000 30 000

2. Emma found some lima beans. She measured a square 10 cm by 10 cm and filled it with beans. There were 47 beans. She calculated that it would take 4700 beans to cover 1 m².

About how many beans would it take to cover the classroom floor?

10 000 30 000 100 000 300 000

3. André found he could put 75 macaroni on a square 10 cm by 10 cm. He calculated that it would take 7500 macaroni to cover 1 m².

About how much floor space would one million macaroni take up?

$\frac{1}{2}$ of a classroom one classroom two classrooms

4. Sophie knew that 100 centimetre cubes would cover a square 10 cm by 10 cm. She calculated that 10 000 cubes would cover 1 m².

About how much floor space would one million cubes take up?

one classroom $1\frac{1}{2}$ classrooms two classrooms

5. Suppose they had tried peas. About 150 peas will cover a square 10 cm by 10 cm. So 15 000 peas will cover 1 m².

About how much floor space would one million peas take up?

one classroom two classrooms three classrooms

Representing Numbers



Quick Review

Here are some ways to represent the number 987 648:

- Use a place-value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	8	7	6	4	8
↑	↑	↑	↑	↑	↑
900 000	80 000	7000	600	40	8

- Use **expanded form**.

$$987\ 648 = (9 \times 100\ 000) + (8 \times 10\ 000) + (7 \times 1000) + (6 \times 100) + (4 \times 10) + (8 \times 1)$$

$$= 900\ 000 + 80\ 000 + 7000 + 600 + 40 + 8$$

- Use words.

987 648 is nine hundred eighty-seven thousand six hundred forty-eight.

- Use standard form.

987 648 is written in standard form.

Try These

1. Record each number in the place-value chart.

- a) 584 628 b) 193 485 c) 76 324 d) 809 241

	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
a)						
b)						
c)						
d)						

Practice

1. Write each number in expanded form.

a) 27 254 _____

b) 856 029 _____

c) 613 875 _____

2. Write each number in question 1 in words.

a) _____

b) _____

c) _____

3. Write each number in standard form.

a) thirty-six thousand two hundred eight _____

b) $300\ 000 + 20\ 000 + 5000 + 300 + 40 + 4$ _____

4. Write the values of each underlined digit.

a) 575 184 _____ b) 874 372 _____ c) 105 628 _____

5. Use the number in the box. Write the digit in the place named.

976 245

a) ten thousands _____ b) tens _____ c) hundreds _____

d) hundred thousands _____ e) ones _____ f) thousands _____

Stretch Your Thinking

Represent and describe the number 791 284 in as many ways as you can.

Estimating Sums



Quick Review

Here are some strategies for estimating a sum.

To estimate $41\ 376 + 20\ 443$:

- Use **front-end rounding**:

$$41\ 376 + 20\ 443 \text{ is about } 40\ 000 + 20\ 000 = 60\ 000.$$

To get a closer estimate, adjust the front-end estimate:

$$41\ 376 + 20\ 443 \text{ is about } 41\ 000 + 20\ 000 = 61\ 000.$$

- Use **compatible numbers**:

Write $41\ 376 + 20\ 443$ as:

$$41\ 300 + 20\ 400 = 61\ 700$$

- To estimate $4365 + 2934 + 8223 + 3785$:

Use front-end rounding:

$$4000 + 2000 + 8000 + 3000 = 17\ 000$$

To adjust the estimate, use **compensation**:

$$4365 + 2934 + 8223 + 3785$$

$$\begin{array}{ccccccc} \downarrow & \downarrow & \downarrow & \downarrow & & & \\ 4000 & + & 3000 & + & 8000 & + & 4000 = 19\ 000 \end{array}$$

Try These

Estimate each sum. Show your work.

1. a) $2893 + 6142$ _____

b) $2005 + 3941$ _____

c) $6734 + 985$ _____

d) $1762 + 4827 + 3995 + 2042$ _____

2. a) Estimate: $8247 + 9468$ _____

b) Use compensation to get a closer estimate.

Practice

Play this game with a partner.

Take turns.

- ▶ Circle 2 numbers in the box.
- ▶ Use a calculator to add the numbers you circled.
- ▶ Use the chart to find how many points you get.
- ▶ Continue to play until all the numbers have been used.

Where Sum Falls	Points You Score
10 000 – 14 000	1
14 000 – 18 000	2
18 000 – 22 000	3
22 000 – 26 000	4

9004	5246	8312	
10 356	6084		
	6524	7642	14 932
5285	11 004		
	8601		10 414
		10 391	
10 323			
	11 002	9734	8205
		7602	

Stretch Your Thinking

The estimated sum of two numbers is 20 000.

What might the numbers be? Give two different answers.

Using Benchmarks to Estimate



Quick Review

To write an estimate for the number 17 823, you can find the closest benchmark:

In thousands: **17 823** is between **17 000** and **18 000**.
It is closer to 18 000.
So, an estimate for 17 823 is 18 000.

In hundreds: 17 **823** is between 17 **800** and 17 **900**.
It is closer to 17 800.
So, a closer estimate for 17 823 is 17 800.

In tens: 17 **823** is between 17 **820** and 17 **830**.
It is closer to 17 820.
So, a very close estimate for 17 823 is 17 820.

Try These

1. Estimate to the nearest thousand.

- a) 5846 _____ b) 24 237 _____ c) 59 300 _____
d) 43 594 _____ e) 6147 _____ f) 68 946 _____

2. Estimate to the nearest hundred.

- a) 8426 _____ b) 27 729 _____ c) 2845 _____
d) 96 324 _____ e) 57 691 _____ f) 4556 _____

3. Estimate to the nearest ten.

- a) 1582 _____ b) 6928 _____ c) 68 793 _____
d) 5446 _____ e) 37 284 _____ f) 6379 _____

4. Write an estimate for 15 941 to the nearest:

- a) thousand _____ b) hundred _____ c) ten _____

Practice

1. Write 3 numbers for which 9000 is an estimate.

2. Write 3 numbers for which 27 800 is an estimate.

3. Write 3 numbers for which 84 760 is an estimate.

4. Sanjaya is buying bottles of water for his boy scout troop. There are 38 scouts in the troop. Bottles of water are sold in packs of 6. How many 6-packs should Sanjaya buy so that each boy gets 1 bottle? Explain.

5. The 2001 population of Iqaluit was 5236.

Find the closest benchmark for each:

in thousands _____ in hundreds _____ in tens _____

6. The world record for the largest collection of bookmarks is 71 235 bookmarks. Find the closest benchmark for each:

a) in thousands _____ b) in hundreds _____

c) in tens _____

7. Kevin Cook has a collection of 11 097 dice.

Write the closest benchmark for this number in hundreds and in tens.

Stretch Your Thinking

Write a number that has the same estimate when using benchmarks in thousands and in hundreds. _____

How did you find your number? _____

Estimating Differences



Quick Review

Here are some strategies for estimating a difference.

- To estimate $6702 - 3494$:

Use front-end rounding.

$6702 - 3494$ is about $6000 - 3000 = 3000$.

To get a closer estimate, look at the last 3 digits of each number.

702 is about 700.

494 is about 500.

$700 - 500 = 200$

Add 200 to the estimate of 3000: $3000 + 200 = 3200$

So, $6702 - 3494$ is about 3200.

- To estimate $5707 - 212$:

Use compatible numbers.

5707 is close to 5712;

then, $5712 - 212 = 5500$

Or, 212 is close to 207;

then, $5707 - 207 = 5500$

- To estimate $3284 - 1935$:

Estimate each number to the closest 1000: $3000 - 2000 = 1000$

To get a closer estimate, estimate each number to the closest hundred:

$3300 - 1900 = 1400$

Try These

1. Estimate each difference. Use any strategy you wish.

a) $6842 - 439$ _____

b) $9527 - 2476$ _____

c) $7654 - 1235$ _____

d) $7024 - 891$ _____

e) $4593 - 2861$ _____

f) $3782 - 422$ _____

2. Use front-end rounding to estimate each difference.

a) $2936 - 481$ _____

b) $8236 - 3719$ _____

Practice

1. Use front-end rounding to estimate each difference.

a) $3842 - 2137$ _____

b) $8204 - 938$ _____

c) $7934 - 4836$ _____

d) $7835 - 5934$ _____

2. Use compatible numbers to estimate each difference.

a) $7634 - 5842$ _____

b) $8378 - 167$ _____

c) $9788 - 2473$ _____

d) $5602 - 410$ _____

3. Jennah has 1250 flyers to deliver. So far, she has delivered 527. About how many flyers does Jennah still have to deliver?

4. Use the data in the table.

Estimate each difference.

a) About how many more tickets were sold on Friday than on Monday? _____

b) About how many more tickets were sold on Wednesday than on Tuesday? _____

c) About how many more tickets were sold on Saturday than on Thursday? _____

Tickets Sold This Week

Day	Number Sold
Monday	964
Tuesday	709
Wednesday	1432
Thursday	1031
Friday	1936
Saturday	2262

5. Toby estimated that $3676 - 493$ was 3100. Was Toby's estimate high or low? Which estimation strategy do you think Toby used?

Stretch Your Thinking

Two 4-digit numbers have a difference of about 1900.

What might the two numbers be?
