

# Exploring Greater Numbers

**Goal** Compare numbers to one million.

**A bumblebee can flap its wings about 200 times per second.**

**A dragonfly can flap its wings about 38 times per second.**

1. Predict how many times a dragonfly flaps its wings in 1000 s.

*Suggested answer:*

about 40 000 times

I rounded 38 to 40 to estimate.

$$40 \times 1000 = 40\,000$$

2. About how many hours would it take for a dragonfly to flap its wings 1 000 000 times? Show your work.

*Suggested answer:*

A dragonfly would have to flap its wings for about 25 000 s.

$$1\,000\,000 \div 40 = 25\,000$$

$$60 \text{ s} \times 60 \text{ min} = 3600 \text{ s in an hour}$$

I'll round 3600 s to 4000 s to estimate.

$$25\,000 \div 4000 = \text{about } 6$$

A dragonfly would take about 6 h to flap its wings 1 000 000 times.

3. a) About how many times can a bumblebee flap its wings in 1000 min?

*Suggested answer:*

In 1 min the bee flaps its wings about  $200 \times 60 = 12\,000$  times.

So, in 1000 min the bee flaps its wings about 12 000 000 times.

- b) How many 1000 thousands is your answer in part a)?

twelve 1000 thousands

## At-Home Help

A **million** is a number that is 1000 thousands.  
1 000 000

To estimate an answer to a problem, use numbers that are close to the values in the problem that are easier to work with.

For example, if a problem involves comparing times in weeks to years, use about 50 weeks in a year.

# Reading and Writing Numbers

**Goal** Read, write, and describe numbers greater than 100 000.

1. Write each number in standard and expanded form.

a)

Millions			Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
			●	●		●	●	●

204 010

$200\,000 + 4\,000 + 10$

b)

Millions			Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		●	●	●	●	●	●	●

1 329 027

$1\,000\,000 + 300\,000 + 20\,000 + 9\,000 + 20 + 7$

2. Write each number as a numeral in standard form.

a) four hundred forty thousand twenty-six

440 026

b) twenty-two thousand eight

22 008

c) seven hundred thirty-one thousand three hundred five

731 305

3. Write the words for each number.

a) 304 000 three hundred four thousand

b) 21 000 twenty-one thousand

c) 12 600 twelve thousand six hundred

4. The sun in our solar system takes about 240 million years to orbit once around the centre of the Milky Way galaxy. Write that number of years in standard form.

240 000 000

## At-Home Help

To read and write large numbers, we group the digits in periods. A **period** is a group of hundreds, tens, and ones.

For example, the place value chart below shows three periods.

third period			second period			first period		
Millions			Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
			●	●	●	●	●	●

The number modelled above is 384 400 in standard form.

In expanded form, the number is  $300\,000 + 80\,000 + 4\,000 + 400$ .

The number in words is three hundred eighty-four thousand four hundred.

# Comparing and Ordering Numbers

**Goal** Compare and order numbers to 1 000 000.

1. Compare each pair of numbers.  
Use an inequality sign.

a) 602 589  $\square$  640 077

b) 314 806  $\square$  409 116

c) 584 192  $\square$  521 009

2. Order the numbers in Question 1 from least to greatest.

314 806, 409 116, 521 009, 584 192, 602 589, 640 077

3. List three numbers between 216 534 and 242 189.

*Suggested answer:*

218 965, 234 567, 240 139

4. a) The number 5  $\square$  8 206 is between  $\square$  96 872 and 512 093. The two missing digits are different. What might they be?

*Suggested answer:*

0 for 508 206

4 for 496 872

- b) Order the numbers from part a) from least to greatest.

496 872, 508 206, 512 093

## At-Home Help

When comparing and ordering numbers to 1 000 000, compare the digits in this order:

- hundred thousands
- ten thousands
- one thousands
- hundreds
- tens
- ones

You can also compare and order numbers by their positions on a number line.

**Inequality signs**  $<$  and  $>$  show that one number is less than or greater than another.

For example,  $8 > 5$  is read “eight is greater than five.”  $5 < 8$  is read “five is less than eight.”

# Renaming Numbers

**Goal** Rename numbers using place value concepts.

- Complete each statement.
  - 4 625 239 is about 5 millions.
  - 276 081 is about 0.3 millions.
  - 3 910 245 is about 4000 thousands.
- Irene takes pictures with her digital camera. The file sizes of four of her pictures are:  
3.2 MB 720 kB 21500 bytes 408350 bytes
  - Write the first two file sizes as a number of bytes.  
3 200 000 bytes, 720 000 bytes
  - Estimate each file size, except for the first one, as millions of bytes or megabytes.  
0.7 MB, 0.02 MB, 0.4 MB
  - Which photo uses the most bytes?  
3.2 MB
- Write each number in another form.
  - 1.9 million = 1 900 000 ones
  - 4.6 million = 4600 thousands
  - 0.28 million = 2800 hundreds

## At-Home Help

When a number is used in a measurement, the way the number is written depends on the size of the unit.

For example, 233 848 bytes can be written as about 0.2 MB.

1 MB is the same as 1 000 000 bytes.

1 kB is the same as 1000 bytes.

1.4 kB can be written as 1400 bytes.

3.13 MB can be written as 3 130 000 bytes.

To compare measurements, compare values using the same units.

For example, if you use bytes

3 130 000 bytes > 233 848 bytes  
> 1400 bytes

# Communicate About Solving Problems

**Goal** Explain your thinking when solving a problem.

A city produced 183 million kilograms of landfill waste in 2003. In 2004, a composting program reduced the landfill waste to 45 million kilograms. About how much less waste was taken to the landfill each day in 2004? Explain how you solved the problem.

Suggested answer:

I write both values on a place value chart.

Millions			Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
●	●●●●	●●						
	●●●	●●●●						

The difference is 138 million.

There are 365 days in a year. I divide 138 million by 365 to calculate how much less waste is taken to the landfill each day.

The problem asks “about how much” so my answer can be an estimate.

I use rounded numbers that are easy to calculate with.

$$160\,000\,000 \div 400 = 400\,000$$

About 400 000 kg less waste was taken to the landfill each day in 2004.

## At-Home Help

When writing a solution to a problem, first write a rough copy.

- If the problem does not ask for an exact answer, use estimation.
- You can use estimation or numbers that are easier to work with.
- Check if your answer is reasonable.

Then write a good copy explaining all your steps.

Remember to show all your work.

## Communication Checklist

- Did you explain your thinking?
- Did you use correct math language?
- Did you include enough detail?

# Reading and Writing Decimal Thousandths

**Goal** Read, write, and model decimals.

1. Write each fraction as a decimal.

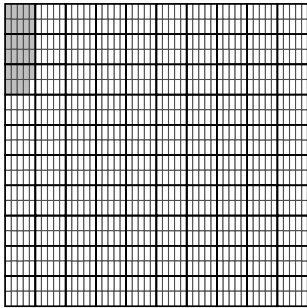
a)  $\frac{29}{1000}$   
0.029

b)  $\frac{503}{1000}$   
0.503

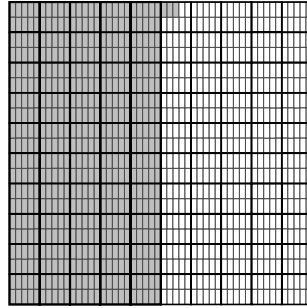
c)  $\frac{790}{1000}$   
0.790

2. Colour a 1000ths grid to represent each fraction.

a)  $\frac{29}{1000}$



b)  $\frac{503}{1000}$



3. Write a decimal for each number.

a) fifty-two hundredths 0.52

b) fifty-two thousandths 0.052

4. Write a decimal to fit each description.

a) one-tenth less than 6.302  
6.202

b) one-thousandth greater than 6.302  
6.303

c) one-hundredth greater than 6.302  
6.312

5. Write each answer in Question 3 in expanded form.

a) 6 ones + 2 tenths + 2 thousandths

c) 6 ones + 3 tenths + 1 hundredth + 2 thousandths

b) 6 ones + 3 tenths + 3 thousandths

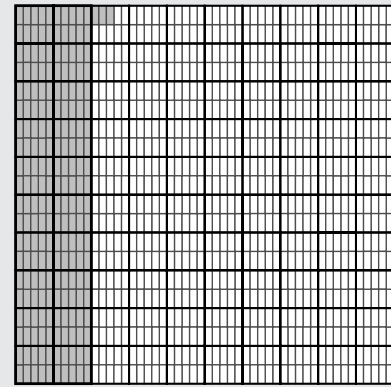
6. List two fractions that are equivalent to 0.400.

Suggested answer:  $\frac{4}{10}$  and  $\frac{400}{1000}$

## At-Home Help

Decimal numbers can be modelled using a grid.

For example, 203 thousandths can be represented as



203 thousandths is written as 0.203 in standard form.

In expanded form, the decimal number is 2 tenths + 3 thousandths.

0.203 can also be written as a fraction.

$$0.203 = \frac{203}{1000}$$

# Rounding Decimals

**Goal**

**Interpret rounded decimals and round decimals to the nearest tenth or hundredth.**

1. Round each decimal to the nearest hundredth.

a)  $0.526$   
 $0.53$

c)  $0.078$   
 $0.08$

b)  $0.896$   
 $0.90$

d)  $3.006$   
 $3.01$

2. Round each decimal to the nearest tenth.

a)  $0.72$   
 $0.7$

c)  $2.462$   
 $2.5$

b)  $1.073$   
 $1.1$

d)  $0.98$   
 $1.0$

3. Which numbers below round to the same hundredth?

2.417 2.423 2.024 2.400

*Suggested answer: 2.417 and 2.423 both round to 2.42.*

4. Name a decimal thousandth that could be rounded as described below.

a) up to 0.35 or down to 0.3

*Suggested answer: 0.348*

b) down to 2.12 or down to 2.1

*Suggested answer: 2.123*

5. Maya cut strips of fabric to make a quilted design. Each piece measured 0.365 m.

If she had measured to the nearest centimetre instead, what might the length of fabric be?

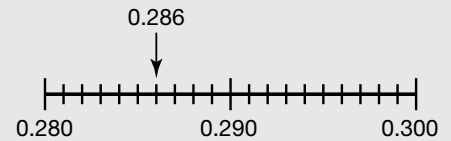
$0.37\text{ m}$

**At-Home Help**

Decimal numbers can be rounded to the nearest tenth or hundredth.

For example, 0.286 rounds up to 0.29 (decimal hundredth) and 0.3 (decimal tenth).

A number line helps with rounding.



# Comparing and Ordering Decimals

**Goal** Compare and order decimals to thousandths.

1. Which decimal is greater?

a) 2.03 or 2.4  
2.4

c) 0.526 or 1.004  
1.004

b) 5.7 or 3.99  
5.7

d) 0.403 or 0.067  
0.403

2. Order these decimal numbers from least to greatest.

a) 2.108 0.053 0.872 1.096  
0.053, 0.872, 1.096, 2.108

b) 2.085 2.008 3.004 2.805  
2.008, 2.085, 2.805, 3.004

3. Which measurement is greater?

a) 0.087 kg or 0.800 kg  
0.800 kg

b) 4.312 km or 3567 m  
4.312 km

c) 450 g or 1.088 kg  
1.088 kg

4. List the numbers of the form  $\square.\square\square$  between 1.3 and 1.5 that are greater than 140 hundredths.

Suggested answer: 140 hundredths is the same as 1.4.

The numbers greater than 1.4 are 1.41, 1.42, 1.43, 1.44, 1.45, 1.46, 1.47, 1.48, and 1.49.

## At-Home Help

To compare and order decimal numbers to thousandths, compare the digits in this order:

- ones
- tenths
- hundredths
- thousandths

You can also compare and order decimals by their positions on a number line.



# Test Yourself Page 1

Circle the correct answer.

1. Which statement is true?

A. 1 million = 100 thousands

C. 1 million = 1000 ten thousands

B. 1 million = 100 000 hundreds

D. 1 million = 10 hundred thousands

2. Which is the expanded form for 2 506 084?

A. 2 000 000 + 50 000 + 6000 + 80 + 4

B. 2 millions + 5 hundred thousands + 6 hundreds + 84 ones

C. 2 000 000 + 500 000 + 6000 + 80 + 4

D. 2 millions + 56 hundreds + 84 ones

3. Which inequality is incorrect?

A.  $206\,354 < 216\,089$

C.  $907\,645 < 980\,004$

B.  $706\,821 > 799\,035$

D.  $625\,138 < 739\,156$

4. What is the correct order of the numbers below from least to greatest?

871 052, 86 304, 280 546, 901 034, 807 621

A. 86 304, 280 546, 871 052, 807 621, 901 034

B. 86 304, 280 546, 807 621, 871 052, 901 034

C. 86 304, 901 034, 871 052, 807 621, 280 546

D. 280 546, 871 052, 807 621, 901 034, 86 304

5. Which estimate is correct?

A. 1.7 MB is about 2 million bytes.

C. 3 230 050 bytes is about 300 kB.

B. 0.4 kB is about 1 thousand bytes.

D. 89 400 bytes is about 1 MB.

6. Which description fits for the number 87 640?

A. eighty-seven thousand sixty-four

B. eight hundred seven thousand sixty-four

C. eight hundred seven thousand six hundred forty

D. eighty-seven thousand six hundred forty

## Test Yourself Page 2

7. Which math statement is incorrect?

A.  $\frac{52}{1000} = 0.052$

C.  $\frac{79}{1000} = 0.790$

B.  $\frac{206}{1000} = 0.206$

D.  $\frac{358}{1000} = 0.358$

8. Which decimal represents the fraction  $\frac{28}{1000}$ ?

A. 0.028

B. 0.280

C. 0.208

D. 2.800

9. Which fraction represents the decimal 0.403?

A.  $\frac{43}{100}$

B.  $\frac{43}{1000}$

C.  $\frac{403}{1000}$

D.  $\frac{430}{1000}$

10. Which numbers below round to the same hundredth?

4.806 3.987 4.813 4.811

A. 3.987, 4.806, 4.813

C. 4.806, 4.811, 4.813

B. 3.987, 4.811, 4.813

D. 3.987, 4.806, 4.811

11. Which number would be 2.065 rounded to the nearest tenth?

A. 2.0

C. 2.5

B. 2.1

D. 2.6

12. What is the order of the numbers below from least to greatest?

1.804, 2.053, 1.692, 0.982, 1.086

A. 0.982, 1.804, 1.086, 1.692, 2.053

C. 0.982, 1.086, 1.692, 1.804, 2.053

B. 0.982, 1.086, 1.804, 1.692, 2.053

D. 0.982, 1.692, 1.804, 1.086, 2.053