LEVEL THIRTEEN

DECIMALS, FRACTIONS, AND THE METRIC SYSTEM

Developmental Mathematics

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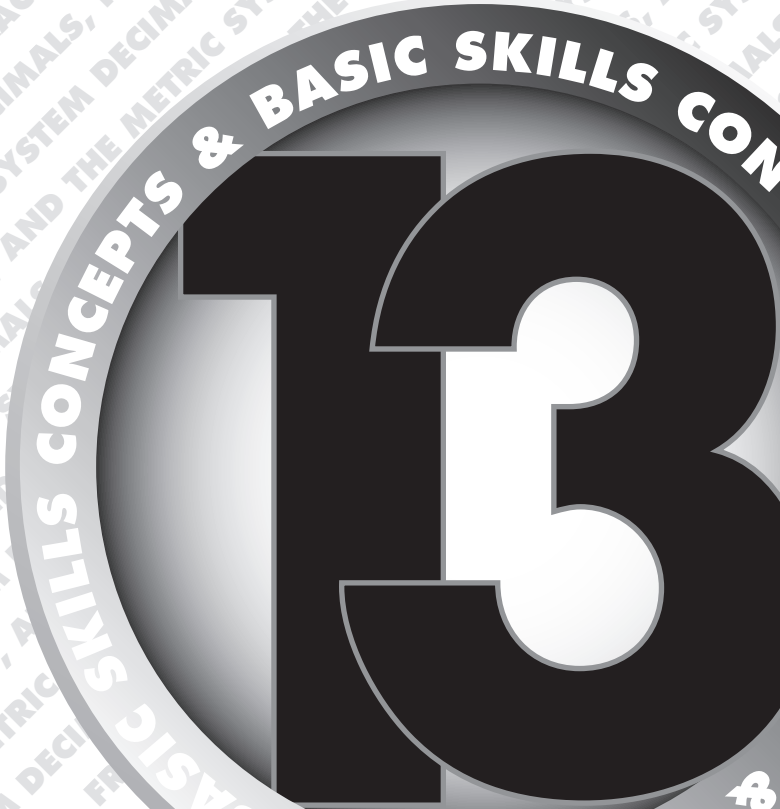


A

Date _____

1 FRACTIONAL UNITS

- Fold a sheet of paper into two equal parts.
  Each part is one-half of the whole.

- Fold a sheet of paper into three equal parts.
  Each part is one-third of the whole.

- Fold a sheet of paper into three equal parts.
  Each part is one-fourth of the whole.

APPLICATIONS

a.

The whole consists of 5 equal parts.
Each part is_____ of the whole.

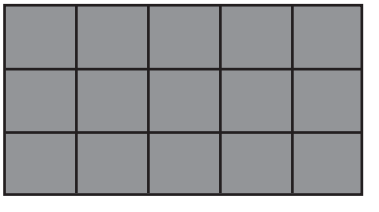
b.

The whole consists of 6 equal parts.
Each part is_____ of the whole.

c.

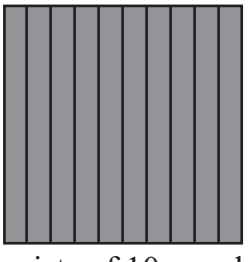
The whole consists of 8 equal parts.
Each part is_____ of the whole.

d.



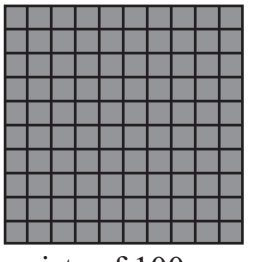
The whole consists of 15 equal parts.
Each part is_____ of the whole.

e.



The whole consists of 10 equal parts.
Each part is_____ of the whole.

f.



The whole consists of 100 equal parts.
Each part is_____ of the whole.

Date _____

Example 1.

The whole is divided into 5 equal parts.
3 parts are shaded.

Each part is one-fifth of the whole.
We say 3 fifths are shaded.

We mean that 3 fifths of the whole figure are shaded.

Example 2.

The whole is divided into 8 equal parts.
5 parts are shaded.

Each part is one-eighth of the whole.
We say 5 eighths are shaded.

We mean that 5 eighths of the whole figure are shaded.

APPLICATIONS

Each figure is divided into equal parts.
What fraction of the figure is shaded?

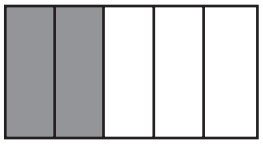
a.

_____

b.

_____

c.



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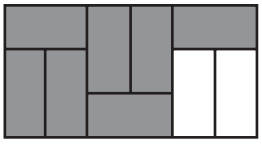
d.



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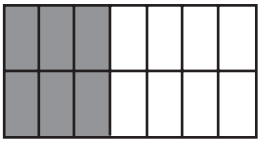
e.



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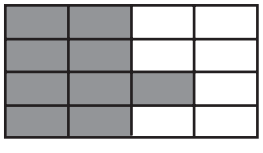
f.



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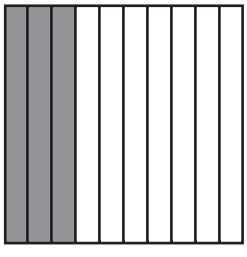
g.



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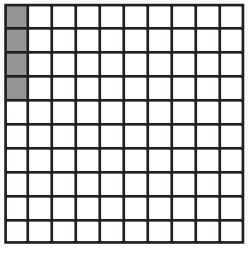
h.



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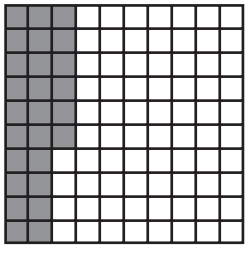
i.



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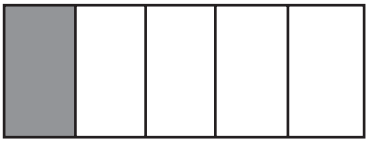
A

Date _____

2 WRITING FRACTIONS

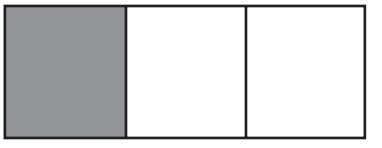
Example 1.



The figure is divided into 5 equal parts.
One part is shaded.

- We say "One-fifth of the figure is shaded."
- For 1 fifth we write $\frac{1}{5}$.

Example 2.



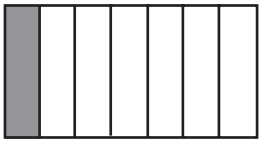
The figure is divided into 3 equal parts.
One part is shaded.

- We say "One-third of the figure is shaded."
- For 1 third we write $\frac{1}{3}$.

APPLICATIONS

Each figure is divided into equal parts.
What fraction of the figure is shaded?

a.



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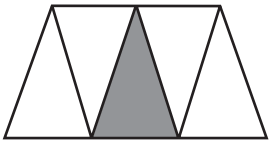
b.

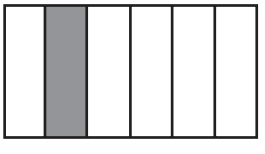


_____

c.

_____

d.



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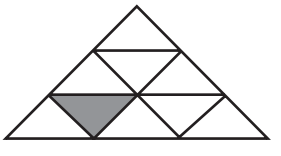
e.



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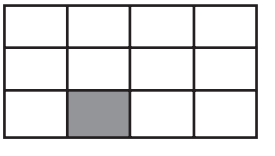
f.



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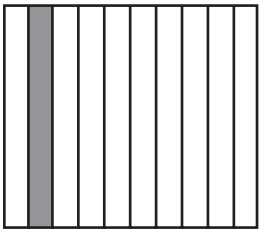
g.



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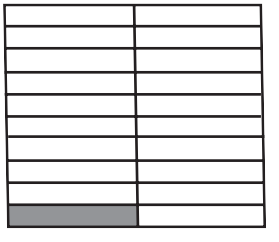
h.



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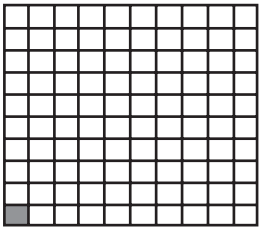
i.



_____

Date _____

Example 3.

The figure is divided into 5 equal parts.
Two parts are shaded.

- We say "Two-fifths of the figure is shaded."
- For 2 fifths we write $\frac{2}{5}$.

Example 4.

The figure is divided into 6 equal parts.
Three parts are shaded.

- We say "Three-sixths of the figure is shaded."
- For 3 sixths we write $\frac{3}{6}$.

APPLICATIONS

Each figure is divided into equal parts.
What fraction of the figure is shaded? What fraction of the figure is blank?

a. 

Shaded: _____

Blank: _____

b. 

Shaded: _____

Blank: _____

c. 

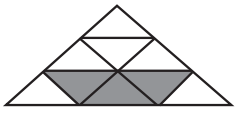
Shaded: _____

Blank: _____

d. 

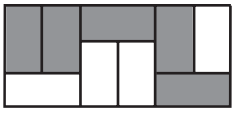
Shaded: _____

Blank: _____

e. 

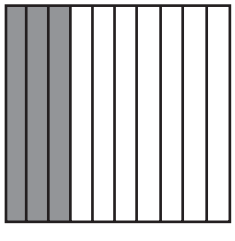
Shaded: _____

Blank: _____

f. 

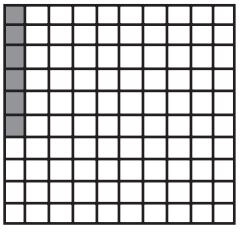
Shaded: _____

Blank: _____

g. 

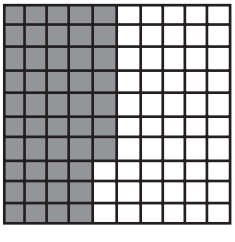
Shaded: _____

Blank: _____

h. 

Shaded: _____

Blank: _____

i. 

Shaded: _____

Blank: _____

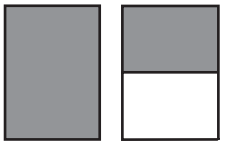
A

Date _____

3 WHOLES AND FRACTIONS

Example 1.

You have 1 gallon and $\frac{1}{2}$ gallon of gas in the tank of your car.



Discussion:

You say "I have one and one-half gallons of gas."

You write $1\frac{1}{2}$ to represent 1 and $\frac{1}{2}$ or $1 + \frac{1}{2}$.

Similarly you write: $3\frac{2}{5}$ to represent 3 and $\frac{2}{5}$ or $3 + \frac{2}{5}$.

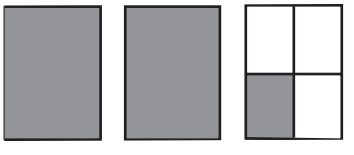
$5\frac{3}{7}$ to represent 5 and $\frac{3}{7}$ or $5 + \frac{3}{7}$.

$9\frac{7}{10}$ to represent 9 and $\frac{7}{10}$ or $9 + \frac{7}{10}$.

$38\frac{19}{100}$ to represent 38 and $\frac{19}{100}$ or $38 + \frac{19}{100}$.

APPLICATIONS

1. The figures in each box are the same size. One of the figures is divided into equal parts. Write the number represented by the shaded area.



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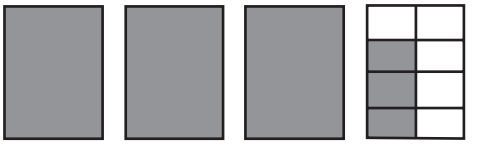


_____

2. Write the number:

a. 1 and 1 third _____

b. 3 and 1 fifth _____

c. 5 and 1 seventh _____

d. 10 and 1 tenth _____

e. 8 and 1 tenth _____

f. 73 and 1 hundredth _____

g. 7 and 2 thirds _____

h. 9 and 5 sevenths _____

i. 9 and 5 tenths _____

j. 2 and 7 hundredth _____

k. $7 + \frac{1}{2}$ _____

l. $3 + \frac{2}{7}$ _____

m. $4 + \frac{3}{10}$ _____

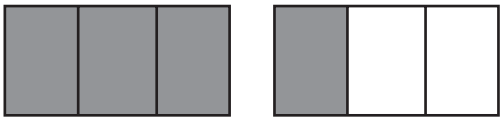
n. $9 + \frac{17}{100}$ _____

Date _____

A

Example 2.

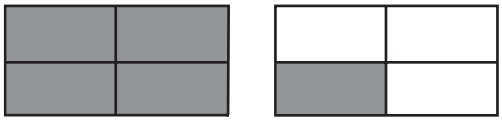
The figures to the right are the same size.
One figure and $\frac{1}{3}$ of the other are shaded.



The one whole may be considered as 3 thirds.
4 thirds are shaded.

$1\frac{1}{3} = \frac{3}{3} + \frac{1}{3} = \frac{4}{3}$

Example 3.



$1\frac{1}{4} = \frac{4}{4} + \frac{1}{4} = \frac{5}{4}$

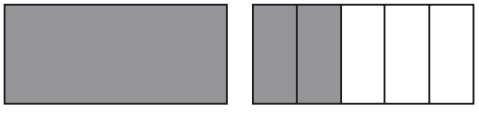
Example 4.

$2\frac{2}{3} = \frac{6}{3} + \frac{2}{3} = \frac{8}{3}$

APPLICATIONS

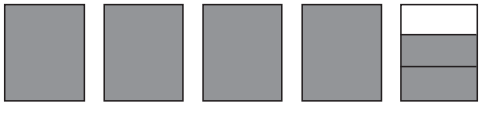
1. Write the missing number:

a.



$1\frac{2}{5} = \frac{7}{\quad}$

b.

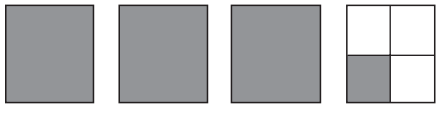


$4\frac{2}{3} = \frac{14}{\quad}$

c.

$2\frac{1}{6} = \frac{13}{\quad}$

d.



$3\frac{1}{4} = \frac{13}{\quad}$

2. Write the answer:
   a. How many halves are in $7\frac{1}{2}$? _____
   b. How many fifths are in $8\frac{3}{5}$? _____
   c. How many sixths are in $7\frac{5}{6}$? _____
   d. How many tenths are in $6\frac{9}{10}$? _____
   e. How many hundredths are in $7\frac{6}{100}$? _____
   f. How many hundredths are in $3\frac{19}{100}$? _____

3. Write the missing number:

a. $2\frac{2}{3} = \frac{\quad}{3}$ b. $3\frac{2}{5} = \frac{\quad}{5}$ c. $5\frac{3}{4} = \frac{\quad}{4}$

d. $5\frac{4}{7} = \frac{\quad}{7}$ e. $9\frac{3}{7} = \frac{\quad}{7}$ f. $7\frac{5}{8} = \frac{\quad}{8}$

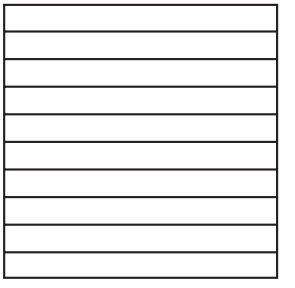
g. $4\frac{9}{10} = \frac{\quad}{10}$ h. $20\frac{7}{10} = \frac{\quad}{10}$ i. $3\frac{7}{100} = \frac{\quad}{100}$

A

Date _____

4 TENTHS

- If you divide a figure into 10 equal parts, each part is 1 tenth of the whole figure, and 10 tenths = 1 whole.



- 1 tenth may be written as $\frac{1}{10}$, 7 tenths as $\frac{7}{10}$.
- 13 tenths may be written $\frac{13}{10}$ or $1\frac{3}{10}$.
  29 tenths may be written $\frac{29}{10}$ or $2\frac{9}{10}$.
- A 3-place numeral represents a number that consists of hundreds, tens, and ones. As an example:

  325 = 3 hundreds + 2 tens + 5 ones

Tens	Ones	Tenths
3	2	5

- You can go on to create a new place for tenths. The numeral written in the boxes to the right represents: 6 tens + 4 ones + $\frac{7}{10}$ or $64\frac{7}{10}$

Tens	Ones	Tenths
6	4	7

- The numeral written in the boxes to the right represents: 8 tens + 0 ones + $\frac{5}{10}$ or $80\frac{5}{10}$.

Tens	Ones	Tenths
8	0	5

- The numeral $39\frac{7}{10}$ is written as shown in the boxes to the right.

Tens	Ones	Tenths
3	9	7

- The numeral $40\frac{8}{10}$ is written as shown in the boxes to the right.

Tens	Ones	Tenths
4	0	8

In such cases we usually use a period to seperate fractions from wholes.
This period is called a "decimal point".

a.

Tens	Ones	Tenths
3	8	4

is written 38.4 and

Tens	Ones	Tenths
5	0	6

is written 50.6.

b. $38\frac{4}{10}$ may be written 38.4 and is read 38 and 4 tenths.

c. 0.3 is read 3 tenths

d. 0.3 is the same a $\frac{3}{10}$

e. 0.8 is read 8 tenths

f. 0.8 is the same as $\frac{8}{10}$

g. 1.2 is read 1 and 2 tenths

h. 1.2 is the same as $1\frac{2}{10}$ or $\frac{12}{10}$

Date _____

APPLICATIONS

1. Use a decimal point to write the numeral presented in the boxes.

a.

Ones	Tenths
	8

= _____

b.

Ones	Tenths
4	9

= _____

c.

Ones	Tenths
1	7

= _____

d.

Ones	Tenths
6	

= _____

e.

Tens	Ones	Tenths
5	3	2

= _____

f.

Tens	Ones	Tenths
9	2	6

= _____

g.

Tens	Ones	Tenths
6	0	7

= _____

h.

Tens	Ones	Tenths
4		8

= _____

2. Use a decimal point to write the following numerals:

a. $\frac{8}{10}$ =

b. $\frac{7}{10}$ =

c. $\frac{1}{10}$ =

d. $\frac{4}{10}$ =

e. $\frac{9}{10}$ =

f. $\frac{6}{10}$ =

g. $2\frac{3}{10}$ =

h. $6\frac{7}{10}$ =

i. $8\frac{5}{10}$ =

j. $3\frac{1}{10}$ =

k. $3\frac{2}{10}$ =

l. $19\frac{8}{10}$ =

m. $\frac{39}{10}$ =

n. $\frac{87}{10}$ =

o. $\frac{138}{10}$ =

p. $\frac{107}{10}$ =

q. $\frac{311}{10}$ =

r. $\frac{706}{10}$ =

3. Write how you read the following numerals:

a. 0.3 is read _____

b. 0.9 is read _____

c. 2.5 is read _____

d. 8.8 is read _____

e. 17.6 is read _____

f. 30.2 is read _____

g. 100.1 is read _____

h. 298.4 is read _____

A

Date _____

GROUPING AND EXCHANGING

How do you write the numeral which represents 39 tenths?
You may use boxes as shown to the right.
But 39 tenths must be grouped into 3 ones and 9 tenths,
and is written as shown to the right.

Ones	Tenths
	39

Ones	Tenths

=

Similarity:

Ones	Tenths
5	14

=

Ones	Tenths
6	4

= 6.4

Ones	Tenths
8	67

=

Ones	Tenths

=

Tens	Ones	Tenths

=

Ones	Tenths
7	50

=

Ones	Tenths

=

Tens	Ones	Tenths

=

Example 1.

Write 89 tenths in the standard form.

Discussion:

The standard form is hundreds, tens, ones, and tenths.

89 tenths must be grouped into 8 ones and 9 tenths, and is written 8.9

Similarly:

a. 73 tenths = _____ b. 51 tenths = _____ c. 289 tenths = _____

Example 2.

How many tenths are in 8?

Discussion:

You know that there are 10 tenths in 1. Thus, 8 = 80 tenths.

Similarly:

a. 5 = _____ b. 3 = _____ c. 29 = _____

Example 3.

How many tenths are in 5.3?

Discussion:

5 = _____ 5 and 3 tenths = _____

Similarly:

a. 3.7 = _____ b. 8.9 = _____ c. 12.5 = _____

Date _____

A

APPLICATIONS

Ones	Tenths
	35

is written

Ones	Tenths
7	16

is written

Ones	Tenths
3	26

is written

Tens	Ones	Tenths
	1	83

is written

Tens	Ones	Tenths
	9	27

is written

Tens	Ones	Tenths
5	7	38

is written

2. Write in the standard form:

a. 8 tenths = _____
b. 9 tenths = _____
c. 38 tenths = _____
d. 27 tenths = _____
e. 50 tenths = _____
f. 80 tenths = _____
g. 127 tenths = _____
h. 108 tenths = _____
i. 130 tenths = _____
j. 190 tenths = _____

3. Change into tenths:

a. 5 = _____ tenths
b. 7 = _____ tenths
c. 4.2 = _____ tenths
d. 3.1 = _____ tenths
e. 14 = _____ tenths
f. 29 _____ tenths
g. 14.8 = _____ tenths
h. 30.4 = _____ tenths

4. Compare the two numbers:

a. Which is larger, 13 or 129 tenths?

b. Which is smaller, 42 or 425 tenths?

5. Arrange the given numbers:

a. Rewrite the following numbers in descending order:
368 tenths, $36\frac{9}{10}$ and 36 _____

b. Rewrite the following numbers in ascending order:
2.4, $\frac{21}{10}$, and 23 tenths _____