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Developmental Mathematics

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CONCEPTS & SKILLS
14

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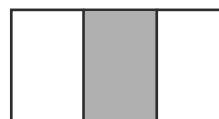
1

FRACTIONAL UNITS

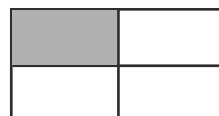
- Fold a sheet of paper into two equal parts.
Each part is one half of the whole.



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

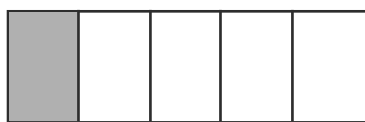


- Fold a sheet of paper into four equal parts.
Each part is one fourth of the whole.



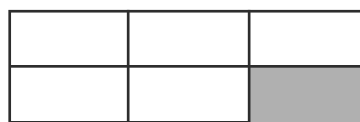
APPLICATIONS

1.



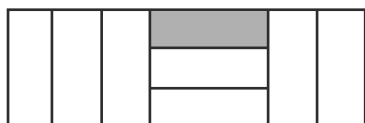
When the whole consists of
5 equal parts, each part is
_____ of the whole.

2.



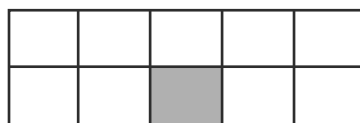
When the whole consists of
6 equal parts, each part is
_____ of the whole.

3.



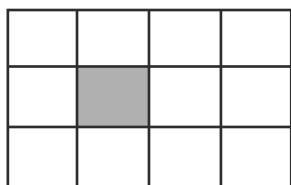
When the whole consists of
8 equal parts, each part is
_____ of the whole.

4.



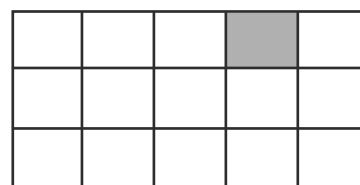
When the whole consist of
10 equal parts, each part is
_____ of the whole.

5.



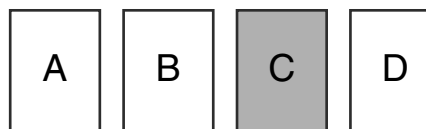
When the whole consists of
12 equal parts, each part is
_____ of the whole.

6.



When the whole consists of
15 equal parts, each part is
_____ of the whole.

7. Boxes A, B, C and D are the same size.
Box C is colored.



- If you put B and C together, what fraction of the figure you obtain would be colored? _____
- If you put A, B, C together, what fraction of the figure you obtain would be colored? _____
- If you put A, B, C and D together, what fraction of the figure you obtain would be colored? _____

8. a. To the right, the colored part is half of the whole figure.
How are parts A and B compared in size? _____

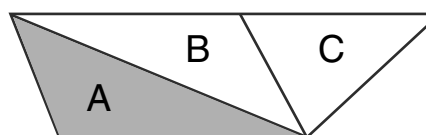


- b. The figure to the right is divided into thirds.
How are parts, X, Y, and Z compared in size? _____

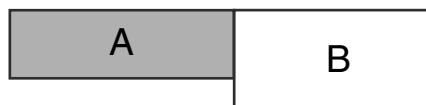


9. Complete the statements:

- a. To the right: A, B, and C are thirds of the whole figure only



- b. To the right: A is half the whole only _____



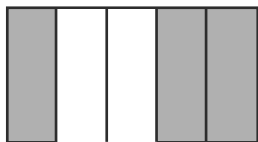
10. a. Two friends own a piece of land.
Does it mean that each person owns one half the land? _____
Why? _____

- b. Two friends equally own a piece of land.
Does it mean that each person owns one half the land? _____
Why? _____

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COUNTING FRACTIONAL UNITS

Example 1.

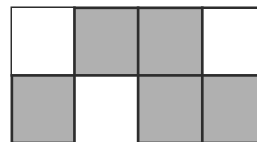


The whole is divided into 5 equal parts.
3 parts are colored.

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

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

Example 2.



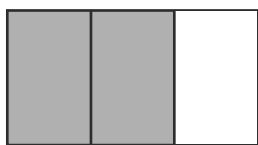
The whole is divided into 8 equal parts.
5 parts are colored.

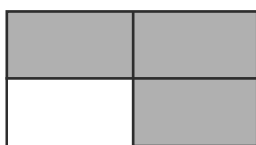
Each part is one eighth of the whole.
We say 5 eighths are colored.

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

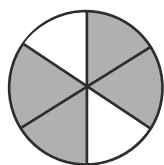
APPLICATIONS

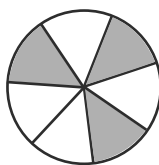
The figures shown below are divided into equal parts.
What fraction of the figure is colored?

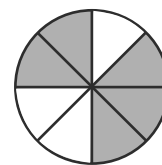


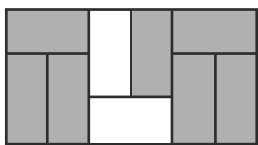


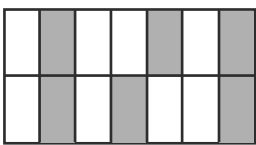


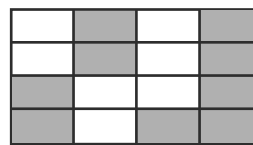






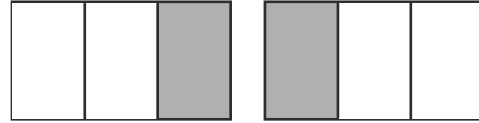






Example 3.

The two figures to the right are the same size.

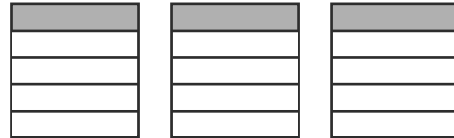


1 third of each figure is colored.

We can count the colored parts as 2 thirds of one figure.

Example 4.

The three figures to the right are the same size



1 fifth of each figure is colored.

We can count the colored parts as 3 fifths of one figure.

Example 5.

You have 7 dimes.

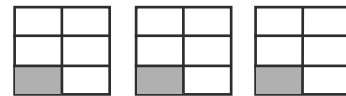


1 dime is 1 tenth of 1 dollar.

In all, you have 7 tenths of 1 dollar.

APPLICATIONS

- The figures to the right are the same size.
Each figure is divided into sixths.
1 sixth of each figure is colored.
Altogether, what fraction of one figure is colored?
- You have 4 cans.
In each can there is 1 fifth of a gallon of gas.
How many gallons of gas do you have?
- Kathy has 5 pieces of ribbon.
Each ribbon is 1 eighth of a yard long.
How many yards of ribbon does Kathy have?
- Mother has 11 slices of cheese.
Each slice is 1 sixteenth of a pound.
How many pounds of cheese does Mother have?
- John has 3 coins. Each coin is 1 fourth of a dollar.
How many dollars does John have?



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COMPARING FRACTIONAL UNITS

Example 1.

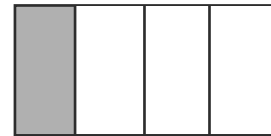
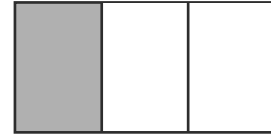
- If you divide a card into 2 equal parts, each part is one half of the card.
- If you divide the same card into 3 equal parts, each part is one third of the card.

Note that one half the card is larger than one third of the same card.

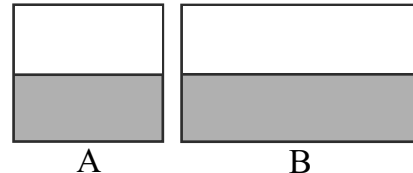
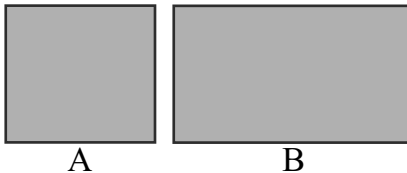
- If you divide the same card into 4 equal parts, each part is one fourth of the card.

Note that one fourth of the card is smaller than one third of the same card.

- When you divide a whole into equal parts, the more parts you obtain, the smaller each part becomes.



Example 2.

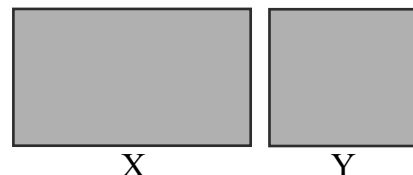
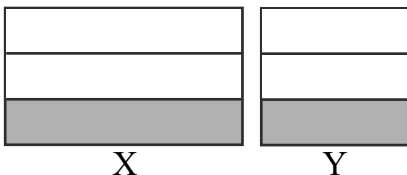


If figure A is smaller than figure B,

then

one half of figure A is smaller than one-half of figure B.

Example 3.



If one third of figure X is larger than one third of the figure Y,

then

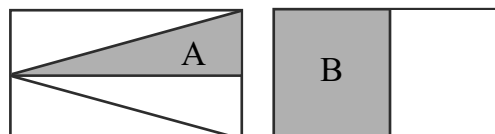
figure X is larger than figure Y.

APPLICATIONS

1. Which is larger: one-fifth of an object or one third of the same object? _____

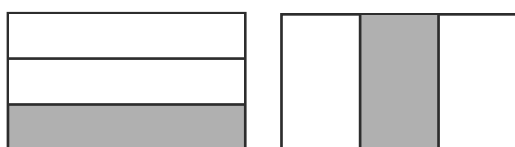
Why? _____

2. The two figures to the right are the same size. Each figure is divided into equal parts as shown.



Compare the colored parts _____

3.



A

B

You are told that one third of the figure A, and one third of figure B, are equal.

Is A smaller than B? _____

Is A larger than B? _____

Is A equal to B? _____

4.



M

N

You are told that one fourth of figure M, and one-fifth of figure N, are equal.

Is M equal to N? _____

Is M larger than N? _____

Is M smaller than N? _____

5.



C

D

C and D are two pieces of meat. One half of C weighs the same as one half of D.

Does C weigh less than D? _____

Does C weigh more than D? _____

Does C weigh the same as D? _____

6.



X

Y

X and Y are two amounts of money. One third of X is less than one third of Y.

Is X equal to Y? _____

Is X larger than Y? _____

Is X smaller than Y? _____

4 HOW CERTAIN FRACTIONAL UNITS ARE RELATED

In certain cases, comparing two fractional units goes beyond finding which unit is larger than the other.

Example 1.

The figure is divided into halves.

1 half of the figure is colored.

- The same figure is made into fourths.

How many fourths are colored?

2 halves have become 4 fourths.

1 half becomes _____ fourths.

- The same figure is made into sixths.

How many sixths are colored?

2 halves became 6 sixths.

1 half became _____ sixths.



Example 2.

A shows a figure divided into halves.

B shows the same figure divided into fourths.

C shows the same figure divided into eighths.

How are 1 half, 1 fourth and 1 eighth compared?

Discussion:

- 2 halves are the same as 4 fourths.
1 half is the same as _____ fourths.
- 2 halves are the same as 8 eighths.
1 half is the same as _____ eighths.
- 4 fourths are the same as 8 eighths.
1 fourth is the same as _____ eighths.



Example 3.

X shows a figure divided into halves.

Y shows the same figure divided into thirds.

Z shows the same figure divided into sixths.

How are 1 half, 1 third and 1 sixth compared?

Discussion:

- 2 halves are the same as 6 sixths.
1 half is the same as _____ sixths.
- 3 thirds are the same as 6 sixths.
1 third is the same as _____ sixths.
- You also know that 1 half is larger than 1 third.



APPLICATIONS

1. The figure to the right is divided into thirds.

If you make the figure into sixths, how many sixths will be colored? _____

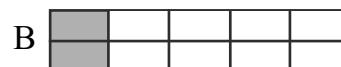


If you make the figure into ninths, how many ninths will be colored? _____

If you make the figure into fifteenths, how many fifteenths will be colored? _____

2. Figure A is divided into fifths, and figure B is divided into tenths.

1 fifth of A is the same as 2 tenths of B only if _____



3. Figure X is larger than figure Y.

Which is larger: 1 fifth of X or 2 tenths of Y? _____



4. a. How many fourths are in 1 half? _____

How many sixths are in 1 half? _____

How many eighths are in 1 half? _____

How many tenths are in one half? _____

- b. How many sixths are in 1 third? _____

How many ninths are in 1 third? _____

How many fifteenths are in 1 third? _____

How many thirtieths are in 1 third? _____

- c. How many eighths are in 1 fourth? _____

How many twelfths are in 1 fourth? _____

How many twentieths are in 1 fourth? _____

How many fortieths are in 1 fourth? _____

- d. How many tenths are in 1 fifth? _____

How many fortieths are in 1 eighth? _____

How many twelfths are in 1 sixth? _____

How many thirtieths are in 1 tenth? _____

Example 4.

- The figure is divided into fourths.
You may group 2 fourths into 1 half.



- The figure is divided into sixths.
You may group 3 sixths into _____



- The figure is divided into eighths.
You may group 4 eighths into _____



Example 5.

- The figure is divided into sixths.
You may group 2 sixths into 1 third.
4 sixths become _____



- The figure is divided into ninths.
You may group 3 ninths into _____
6 ninths become _____



Example 6.

- The figure is divided into eighths.
You may group 2 eighths into 1 fourth.
- 4 eighths become _____
 - 6 eighths become _____



Example 7.

- The figure is divided into tenths.
You may group 2 tenths into 1 fifth.
- 4 tenths become _____
 - 6 tenths become _____
 - 8 tenths become _____



Example 8.

- The figure is divided into twelfths.
You may group 2 twelfths into 1 sixth.
- 4 twelfths become _____
 - 6 twelfths become _____
 - 8 twelfths become _____
 - 10 twelfths become _____



APPLICATIONS

1. The figure is divided into tenths.

You group 2 tenths into _____

a. 4 tenths become _____

b. 8 tenths become _____



2. The figure is divided into twelfths.

You group 4 twelfths into _____

8 twelfths become _____



3. The figure is divided into twentieths.

You group 4 twentieths into _____

a. 12 twentieths become _____

b. 16 twentieths become _____



4. The figure is divided into twentieths.

You group 5 twentieths into _____

a. 10 twentieths become _____

b. 15 twentieths become _____



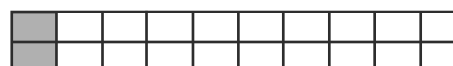
5. The figure is divided into twentieths.

You group 2 twentieths into _____

a. 6 twentieths become _____

b. 8 twentieths become _____

c. 12 twentieths become _____



6. Write the answer:

a. 2 fourths = _____

c. 4 eighths = _____

e. 2 sixths = _____

g. 4 twelfths = _____

i. 2 eighths = _____

b. 3 sixths = _____

d. 5 tenths = _____

f. 3 ninths = _____

h. 5 fifteenths = _____

j. 3 twelfths = _____

7. Write the missing number:

a. 4 sixths = _____ thirds

c. 6 eighths = _____ fourths

e. 8 tenths = _____ fifths

g. 6 tenths = _____ fifths

i. 6 fifteenths = _____ fifths

b. 4 eighths = _____ fourths

d. 6 ninths = _____ thirds

f. 10 twelfths = _____ sixths

g. 10 fifteenths = _____ thirds

j. 9 fifteenths = _____ fifths