COMMON CORE CLINICS

Mathematics

CLINICS

Number and Operations in Base Ten

Options

Module

1

Number and Operations in Base Ten

1 Read and Write Whole Numbers

The ten digits used in our base-ten number system are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. **Place value** is the value of the place of a digit in a numeral. The value of each place is ten times the value of the place to its right. The numbers 1, 2, 3, and so on without end are called **whole numbers**.

You can represent a whole number in different ways.

base-ten numerals: 54,728

number name: fifty-four thousand, seven hundred twenty-eight

expanded form: 50,000 + 4,000 + 700 + 20 + 8

Example

What is the number name and expanded form of 37,406?

Write the number in a place-value chart.

Hundred Thousands	Ten Thousands	Thousands	,	Hundreds	Tens	Ones
	3	7	,	4	0	6

Read the value of the digits before the comma.

thirty-seven thousand

Read the value of the digits after the comma.

four hundred six

Write the number name.

thirty-seven thousand, four hundred six

Find the value of each digit.
Then write the values as a sum.

30,000 + 7,000 + 400 + 6

The number name for 37,406 is
thirty-seven thousand, four hundred six.

In expanded form, 37,406 is
30,000 + 7,000 + 400 + 6.

CONCLUDE

How do you know where to write the comma when writing a base-ten numeral?

Guided Practice

1 What is the value of the digit 4 in 549,062?

Step 1 Write the number in a place-value chart.

Hundred Thousands	Ten Thousands	Thousands	,	Hundreds	Tens	Ones
			,			

Step 2 Find the position of the 4 in the number.

The digit 4 is in the _____ place.

Step 3 Use the digit and its position in the number to write the value of the digit.

The value of the 4 is _____.

The value of the digit 4 in 549,062 is _____.

2 What is eight hundred six thousand, fifteen in base-ten numerals?

Step 1 Write the number in a place-value chart.

Hundred Thousands	Ten Thousands	Thousands	,	Hundreds	Tens	Ones
			,			

Step 2 Write the number using digits.

_____

Eight hundred six thousand, fifteen in base-ten numerals is _____.

Independent Practice

1. How is the base-ten form of a number different from the expanded form of the number?

_____

_____

Ask Yourself

What place is each digit in?

Do I need to write zeros?
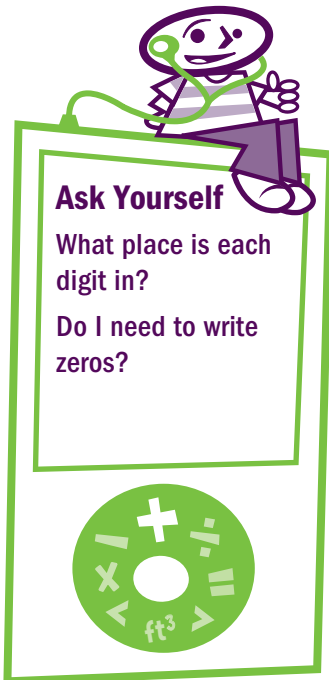
What is the value of each underlined digit?

2. <u>6</u>,987 _____

3. 75,0<u>3</u>8 _____

4. 3<u>2</u>,419 _____

5. 3<u>8</u>1,005 _____

6. Write 300,000 + 50,000 + 2,000 + 900 + 40 using base-ten numerals.

_____

7. Write seventy-one thousand, thirty using base ten-numerals.

_____

8. Write 7,081 in expanded form.

_____

9. Write the number name for 100,050.

_____

10. Last year, 427,230 people visited the zoo. Write 427,230 in expanded form.

_____

Use place value to continue each pattern.

11. 210 220 230 _____ _____

12. 42,518 43,518 44,518 _____ _____

13. 174,326 174,426 174,526 _____ _____

14. 308,248 318,248 328,248 _____ _____

15. Write the number name for the number that is 1,000 more than 27,491.

_____

Solve each problem.

16. The diameter of Mercury is three thousand, thirty-two miles.
Write the diameter of Mercury using base-ten numerals.

_____

17. The diameter of Neptune is 30,603 miles.
Write the number name for the diameter of Neptune.

_____

18. The diameter of Jupiter is 88,732 miles.
Which 8 in 88,732 has the greater value? Explain.

_____

_____

COMMON CORE CLINICS

Grade 4

CLINICS

Mathematics

Number and Operations —Fractions

Options

Number and Operations–Fractions

1 Equivalent Fractions

A **fraction** is a number that names equal parts of a whole or equal parts of a group. The **numerator** of a fraction is the top number. It tells how many equal parts are represented by the fraction. The **denominator** is the bottom number. It tells the number of equal parts into which the whole or the group is divided.

Equivalent fractions name the same amount but have different numerators and denominators. To find equivalent fractions, multiply the numerator and the denominator by the same number. When you multiply the numerator and denominator by the same number, you are multiplying the fraction by 1. For example, $\frac{2}{2} = 1$ and $\frac{8}{8} = 1$.

Example

Write two fractions that are equivalent to $\frac{2}{3}$.

Multiply the numerator and the denominator by the same number. Use 2.

$$\frac{2}{3} = \frac{2 \times \mathbf{2}}{3 \times \mathbf{2}}$$
$$= \frac{4}{6}$$

You can use fraction models to see that $\frac{2}{3} = \frac{4}{6}$.

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

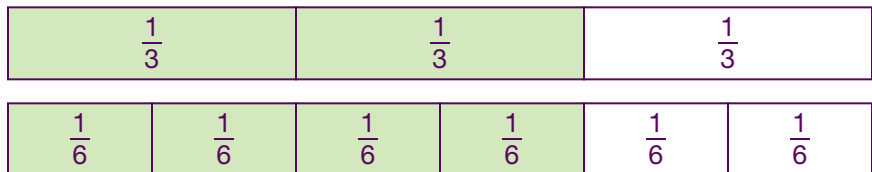| $\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

For $\frac{2}{3}$, 2 out of 3 parts are shaded. That model has fewer parts and the parts are larger.

For $\frac{4}{6}$, 4 out of 6 parts are shaded. That model has more parts and the parts are smaller.

The models are the same size and the same amount of each model is shaded. This shows that the fractions $\frac{2}{3}$ and $\frac{4}{6}$ are equivalent.
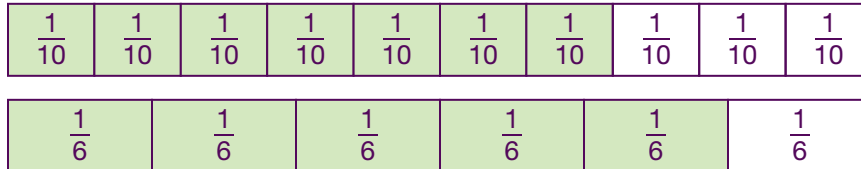
RELATE

How do the denominators of two equivalent fractions compare with each other? How do the numerators of two equivalent fractions compare with each other? Explain.

Guided Practice

1 Is $\frac{7}{10}$ equivalent to $\frac{5}{6}$?

Step 1 Use fraction models to represent each fraction. Be sure the models are aligned to the same whole.

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

Step 2 Look at the fraction models.

Do the fractions show the

same amount? _____

Is $\frac{7}{10}$ equivalent to $\frac{5}{6}$? _____

THINK

Is the amount shaded to represent $\frac{5}{6}$ the same as the amount shaded to represent $\frac{7}{10}$?

2 What fraction with a denominator of 8 is equivalent to $\frac{1}{2}$?

$\frac{1}{2} = \frac{?}{8}$

Step 1 Find the number that 2 is multiplied by to get 8. Find the missing factor: $2 \times$ _____ $= 8$

Step 2 Use the factor to find the missing numerator.

$$\frac{1}{2} = \frac{1 \times \square}{2 \times \square} = \frac{\square}{8}$$
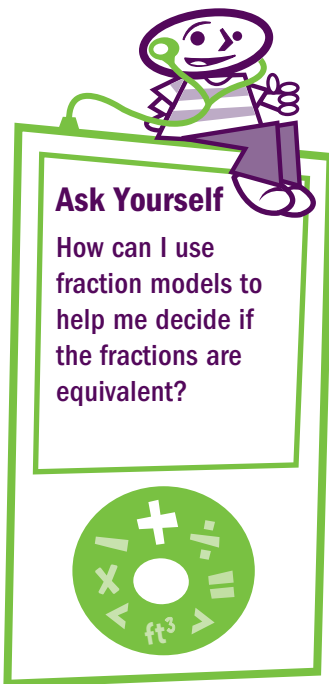
$$\frac{1}{2} = \frac{\square}{8}$$

REMEMBER

To find equivalent fractions, you can multiply the numerator and the denominator by the same number.

Independent Practice

1. Why can you multiply the numerator and the denominator of a fraction by the same number to write an equivalent fraction?

_____

_____

2. If two fractions are equivalent, what must be true about models for the fractions?

_____

_____

Ask Yourself

How can I use fraction models to help me decide if the fractions are equivalent?

Find a fraction that is equivalent to each fraction.

3. $\frac{1}{3}$ _____

4. $\frac{1}{2}$ _____

5. $\frac{2}{5}$ _____

6. $\frac{1}{4}$ _____

7. $\frac{3}{4}$ _____

8. $\frac{3}{5}$ _____

Decide whether the fractions are equivalent. Write *yes* or *no*.

9. $\frac{3}{4}$ and $\frac{3}{6}$ _____

10. $\frac{1}{3}$ and $\frac{4}{12}$ _____

11. $\frac{1}{2}$ and $\frac{5}{10}$ _____

12. $\frac{4}{5}$ and $\frac{5}{8}$ _____

13. $\frac{2}{5}$ and $\frac{4}{10}$ _____

14. $\frac{1}{4}$ and $\frac{3}{12}$ _____

15. $\frac{3}{5}$ and $\frac{1}{2}$ _____

16. $\frac{4}{8}$ and $\frac{8}{12}$ _____

17. A pizza is cut into 8 equal slices. Dennis eats $\frac{1}{4}$ of the pizza, and Enid eats $\frac{2}{8}$ of the pizza. Did they eat the same amount of pizza? Explain.

_____

Complete each equivalent fraction.

18. $\dfrac{1}{2} = \dfrac{\square}{6}$

19. $\dfrac{5}{\square} = \dfrac{10}{12}$

20. $\dfrac{3}{4} = \dfrac{6}{\square}$

21. $\dfrac{\square}{4} = \dfrac{3}{12}$

22. $\dfrac{3}{\square} = \dfrac{30}{100}$

23. $\dfrac{2}{6} = \dfrac{\square}{3}$

24. $\dfrac{1}{5} = \dfrac{20}{\square}$

25. $\dfrac{1}{4} = \dfrac{\square}{8}$

26. $\dfrac{1}{\square} = \dfrac{5}{10}$

27. $\dfrac{\square}{6} = \dfrac{2}{3}$

28. $\dfrac{4}{5} = \dfrac{\square}{10}$

29. $\dfrac{6}{\square} = \dfrac{1}{2}$

Solve each problem.

30. Camille makes a juice blend using $\dfrac{1}{2}$ cup of orange juice and $\dfrac{3}{8}$ cup of pineapple juice. Does she use the same amount of orange juice and pineapple juice? Explain.

_____

31. Marshall says that $\dfrac{3}{4}$ and $\dfrac{3}{8}$ are equivalent fractions. Is he correct? How do you know?

_____

32. Wanda and Casey each write a fraction. Wanda's fraction has a denominator of 10. Casey's fraction also has a denominator of 10. What must be true about the numerators for the fractions to be equivalent fractions?

_____

COMMON CORE CLINICS

Grade 4

CLINICS

Mathematics

Operations and Algebraic Thinking

Options

Operations and Algebraic Thinking

1 Factors and Multiples

Key Words

composite number
factor
multiple
prime number

When you multiply two whole numbers, the numbers you multiply are **factors** of the product. For example, $4 \times 8 = 32$, so 4 and 8 are factors of 32. 4 and 8 are a factor pair of 32. A factor of a number divides evenly into the number, which means there is no remainder.

The product of two whole numbers is a **multiple** of each of the numbers that were multiplied. So 32 is a multiple of 4 and a multiple of 8.

A **prime number** has exactly two factors: 1 and itself. A **composite number** has more than two factors. The number 1 is neither prime nor composite since it has exactly one factor, itself.

Example

What are the factors of 36? What are the factor pairs of 36?

Find all the multiplication sentences for 36.

Try 2. Think: $2 \times 18 = 36$. 2 and 18 are a factor pair of 36.

Try 3. Think: $3 \times 12 = 36$. 3 and 12 are a factor pair of 36.

Try 4. Think: $4 \times 9 = 36$. 4 and 9 are a factor pair of 36.

Try 5. Think: No number multiplied by 5 equals 36. 5 is not a factor of 36.

Try 6. Think: $6 \times 6 = 36$. 6 is a factor of 36. 6 and 6 are a factor pair of 36.

Try 7 and 8. Neither number can be multiplied to equal 36.

Try 9. 9 is a factor with 4.

When the factor pairs start repeating, you have found all the factors of the number.

List the factors in order from least to greatest. Remember, 1 and the number itself are a factor pair of every number.

ANALYZE

Why is 36 a multiple of all its factors?

The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36. The factor pairs of 36 are 1 and 36, 2 and 18, 3 and 12, 4 and 9, 6 and 6.

Guided Practice

1 Is 72 a multiple of 12?

Step 1 Make a list of multiples of 12.

List the multiples of 12 until you reach or pass 72.
$12 \times 1 = 12$
$12 \times 2 = 24$
$12 \times 3 = 36$
$12 \times 4 = 48$
$12 \times 5 = 60$
$12 \times 6 = 72$

THINK

Multiply 12 by 1, 2, 3, 4, and so on to find multiples of 12.

Step 2 Look at the list of multiples.

Is 72 in the list of multiples of 12? _____

Answer *is* or *is not* to complete the sentence.

72 _____ a multiple of 12.

2 Is 49 a prime number or a composite number?

Step 1 Find all the factors of 49.

$1 \times$ _____ $= 49$

$7 \times$ _____ $= 49$

The factors of 49 are 1, _____, and _____.

Step 2 Decide if 49 is prime or composite.

Does 49 have more than 2 factors? _____

Is 49 prime or composite? _____

49 is a _____ number.

REMEMBER

A composite number has more than 2 factors.

Independent Practice

1. How do you find all the factors of a number?

_____

_____

2. Explain how to decide if a number is a multiple of another number.

_____

_____

Ask Yourself

Which whole numbers can you multiply to find the product?

Find the factors of each number.

3. 12 _____

4. 20 _____

5. 24 _____

6. 54 _____

Find the first 5 multiples of each number.

7. 8 _____

8. 15 _____

9. 20 _____

10. Is 58 a multiple of 8? Explain.

_____

List the factor pairs of each number.

11. 42 _____

12. 65 _____

13. 76 _____

14. 100 _____

Write *prime* or *composite* for each number.

15. 14 _____

16. 9 _____

17. 3 _____

18. 23 _____

19. 10 _____

20. 25 _____

21. 2 _____

22. 19 _____

23. 21 _____

24. 43 _____

25. 39 _____

26. 77 _____

Solve each problem.

27. Every even number is a multiple of 2. Why?

_____

28. Camille swims every day in May that is a prime number.
How many days does Camille swim in May? What are the dates?

_____

29. Nathan has 45 muffins to put into packages.
How can he use the factors of 45 to divide the muffins evenly?

_____

_____

COMMON CORE CLINICS

Mathematics

Grade 4

CLINICS

Measurement, Data, and Geometry

You can add, subtract, multiply, or divide to solve problems involving money. When you compute with money, remember to write the dollar sign and the decimal point in the answer. The decimal point separates the dollars from the cents.

Example

Georgia bought 6 tubes of paint for $31.50. Each tube of paint cost the same amount. How much did one tube of paint cost?

Choose the operation.
Each of 6 tubes of paint cost the same amount. The total is $31.50.
Divide to find the cost of one tube of paint.

Divide: $31.50 ÷ 6

Write the decimal point above the decimal point in the dividend.
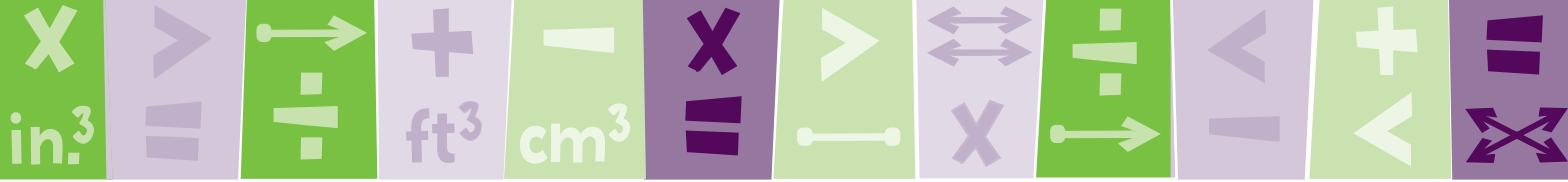
$$6\overline{)31.50}$$

Divide as with whole numbers.

$$\begin{array}{r} 5.25 \\ 6\overline{)31.50} \\ -30 \\ \hline 1\,5 \\ -1\,2 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

$31.50 ÷ 6 = $5.25

One tube of paint cost $5.25.

COMPARE

How is dividing with money amounts similar to dividing with whole numbers? How is it different?

Guided Practice

Quinn bought a skateboard for $45.95 and a helmet for $32.50, including tax. He paid for the items with four $20 bills. How much change should Quinn receive?

Step 1 Find the total cost of the skateboard and the helmet.

Add: $45.95 + $32.50

Write the addends vertically, and add as with whole numbers.

$$\begin{array}{r} \$4\ 5\ .\ 9\ 5 \\ +\quad 3\ 2\ .\ 5\ 0 \\ \hline \$\ \square\ \square\ .\ \square\ \square \end{array}$$

Step 2 Find how much money Quinn used to pay for the items.

Multiply: 4 × $20.00

Write the factors vertically, and multiply as with whole numbers.

$$\begin{array}{r} \$20.00 \\ \times\quad\quad 4 \\ \hline \$80.00 \end{array}$$

Step 3 Subtract the total cost from the amount Quinn used to pay for the items.

Subtract: $80.00 − $78.45

Write the problem vertically, and subtract as with whole numbers.

$$\begin{array}{r} \$8\ 0\ .\ 0\ 0 \\ -\quad 7\ 8\ .\ 4\ 5 \\ \hline \$\quad \square\ .\ \square\ \square \end{array}$$
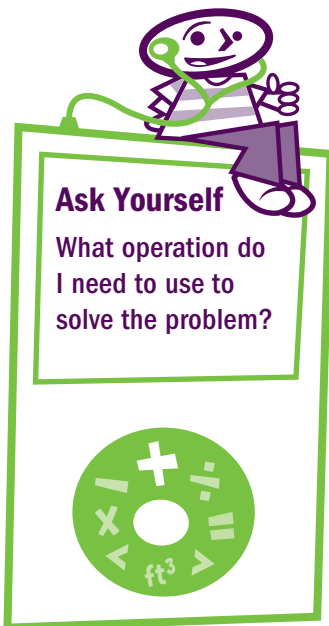
Quinn should receive _____ in change.

Independent Practice

1. Explain how to add, subtract, multiply, and divide with money amounts.

_____

_____

2. Why is it necessary to include the decimal point in money amounts that represent dollars and cents?

_____

_____

Ask Yourself

What operation do I need to use to solve the problem?

Add, subtract, multiply, or divide to find each answer.

3.
$$\begin{array}{r} \$64.50 \\ +\ \ 12.95 \\ \hline \end{array}$$

4.
$$\begin{array}{r} \$17.28 \\ -\ \ 9.34 \\ \hline \end{array}$$

5.
$$\begin{array}{r} \$5.72 \\ \times\ \ \ \ \ 6 \\ \hline \end{array}$$

6. $\$17.44 \div 8 =$ _____

7. $\$74.67 - \$12.99 =$ _____

8. $\$5.34 \div 6 =$ _____

9. Jasmine bought 8 pairs of socks. Each pair cost $3.45. How much did the socks cost in all?

_____

10. Giorgio saved $8.25 from his allowance last week. This week, he saved $6.95 from his allowance. How much more did Giorgio save last week than this week?

_____

Solve each problem.

11. For lunch, Andrea buys a sandwich for $3.60, an orange for $0.85, and a granola bar for $1.39. How much does Andrea spend on her lunch in all?

_____

12. Chad bought a bag containing 5 tennis balls for $5.45. How much did each tennis ball cost?

_____

13. Nora buys 3 pounds of grapes and 2 pounds of apples. The grapes cost $2.05 per pound, and the apples cost $1.14 per pound. How much do the grapes and apples cost in all?

_____

14. Danny buys a pair of running shoes that are on sale for $12.99 off the regular price. He uses a coupon for $5.00 off when he pays for the shoes. The regular price of the shoes is $74.67. How much does Danny pay for the running shoes?

_____

15. The basketball team raised $64.50 washing cars. They will use the money to buy new jerseys for the 8 players on the team. The jerseys cost $19.24 each. How much more money does the team need to raise to pay for the jerseys?

_____

16. Neil bought 4 pounds of potatoes. He paid with a $10.00 bill and received $4.20 in change. How much did Neil pay for 1 pound of potatoes?

_____