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NEW JERSEY CENTER
FOR TEACHING & LEARNING

6th Grade

Fraction & Decimal Computation

2017-01-27

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Fraction and Decimal Computation

Click on the topic to go to that section

Teacher Notes

Fraction Division

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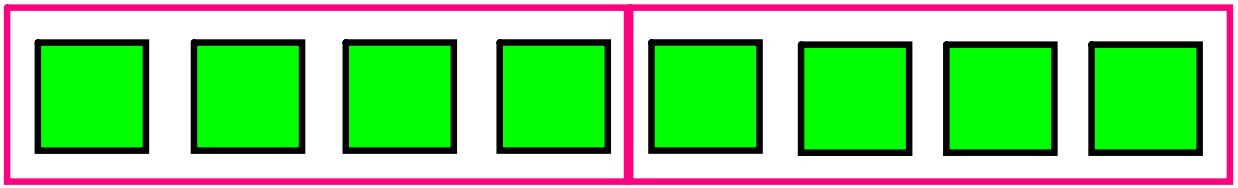
Modeling Division

Recall from 5th grade:

When we are dividing, we are breaking apart into equal groups.

Dividend ÷ Divisor = Quotient

The model below represents: $8 \div 4 = 2$



2 groups of 4

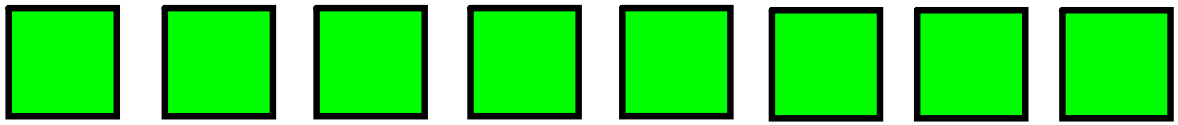
Applying to Fractions

The previous example used whole numbers and grouped the dividend according to the divisor.

The same strategy can be applied when dividing with fractions.

Use the model below to demonstrate: $8 \div \frac{1}{2}$

8



$\frac{1}{2}$

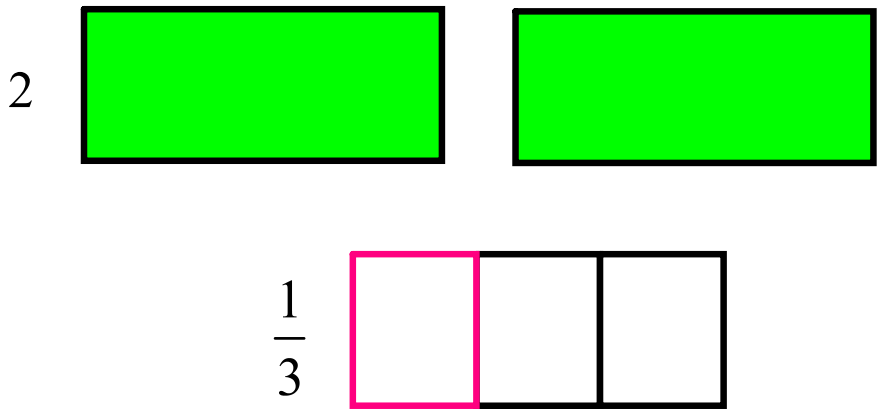
The pink rectangle represents $\frac{1}{2}$.

See how many you can fit in the 8 squares.

Teacher Notes

Example

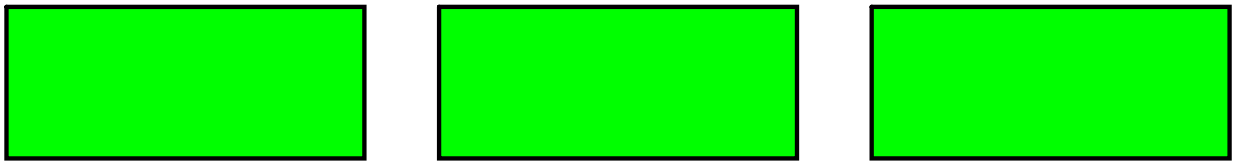
Use the model below to demonstrate $2 \div \frac{1}{3}$



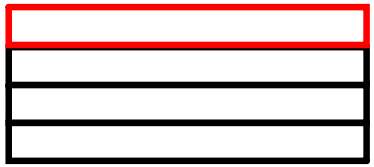
1 Evaluate the following problem using the model below.

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

3



$\frac{1}{4}$

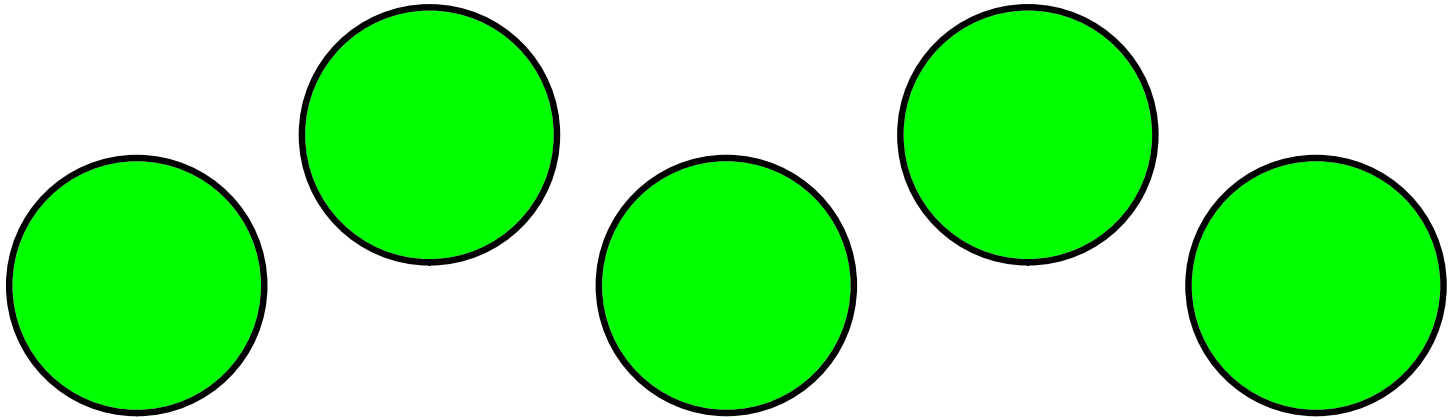


Answer

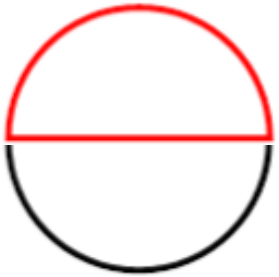
2 Evaluate the following problem using the model below.

$$5 \div \frac{1}{2} =$$

5



$\frac{1}{2}$

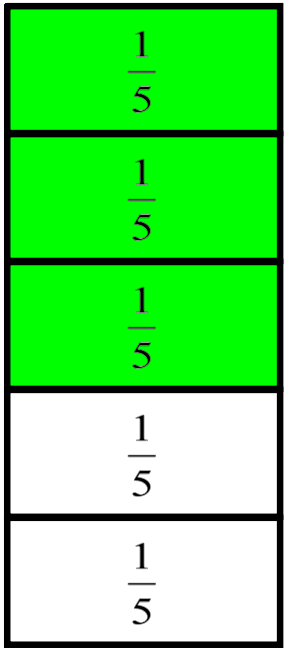


Answer

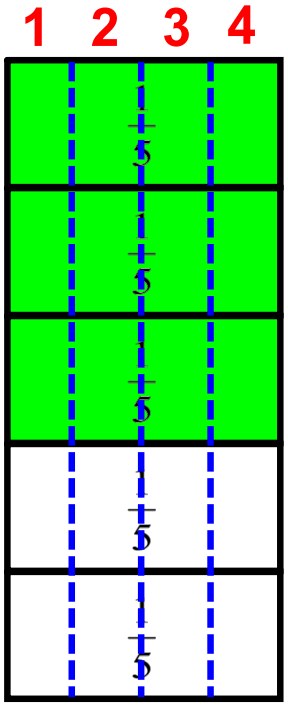
Visual Model

A fraction can be divided by a whole number using the following visual model.

$$\frac{3}{5} \div 4$$



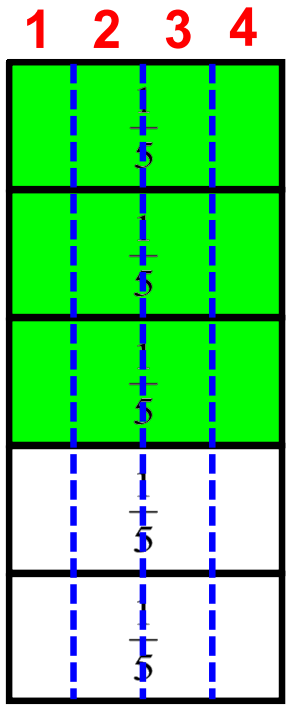
Divide into 4 groups



Answer

Word Problem

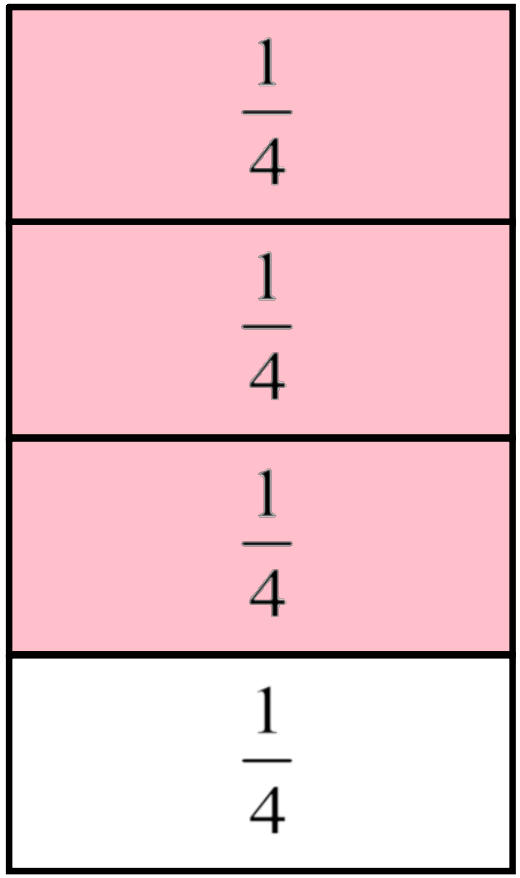
The previous expression can be represented by the following word problem: How much will each person receive if 4 friends share a $\frac{3}{5}$ pound bag of popcorn?



Each friend will receive $\frac{3}{20}$ lb. of popcorn.

3 Evaluate the following problem using the model below.

$$\frac{3}{4} \div 6$$

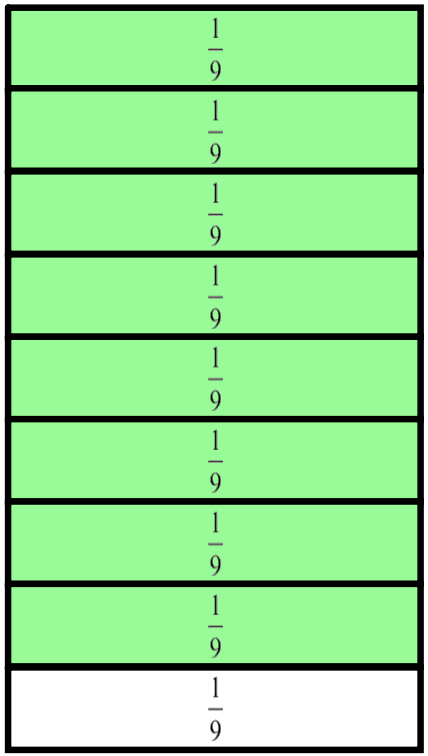


Drag the line

Answer

4 Evaluate the following problem using the model below.

$$\frac{8}{9} \div 2$$



Drag the line

Answer

Word Problem

Create a story to represent the problem and use a visual model to show the quotient.

$$\frac{6}{10} \div 3$$

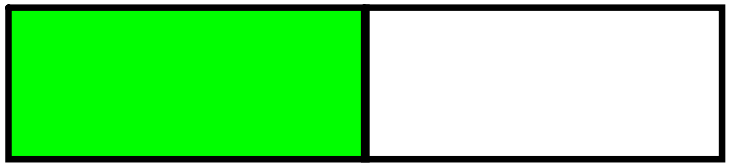
Fraction Divided by a Fraction

The same strategy we utilized for the previous examples can also be applied when dividing a fraction by another fraction.

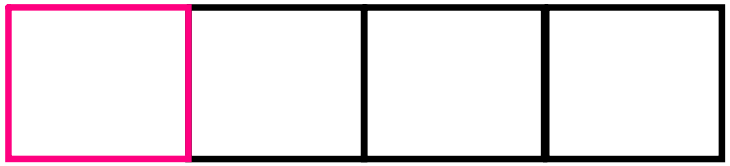
In this example our division problem is: $\frac{1}{2} \div \frac{1}{4}$

We need to determine how many $\frac{1}{4}$'s there are in $\frac{1}{2}$

$\frac{1}{2}$

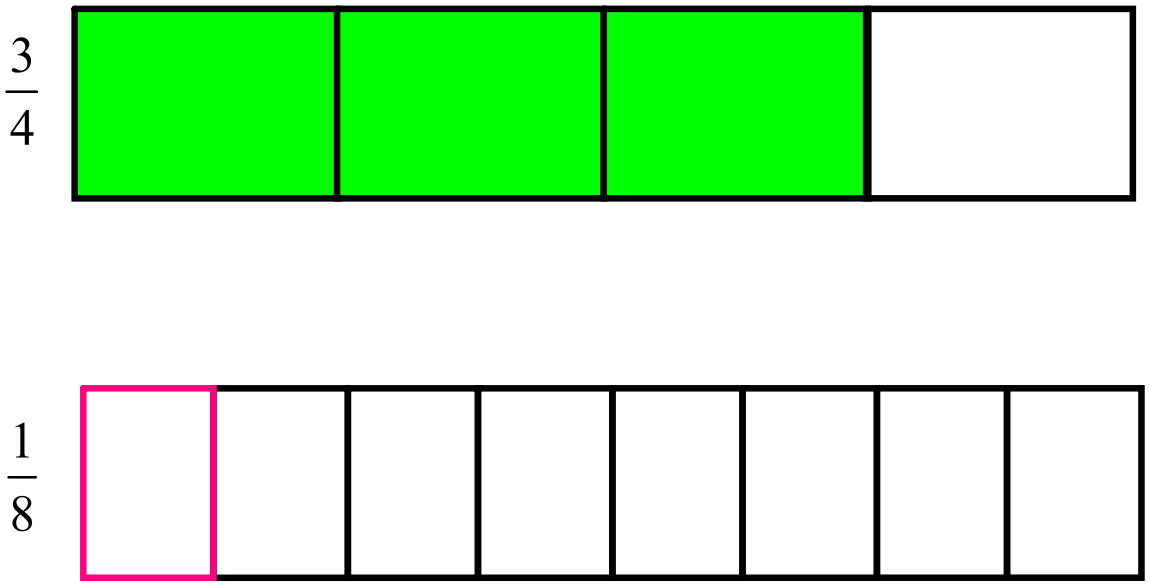


$\frac{1}{4}$



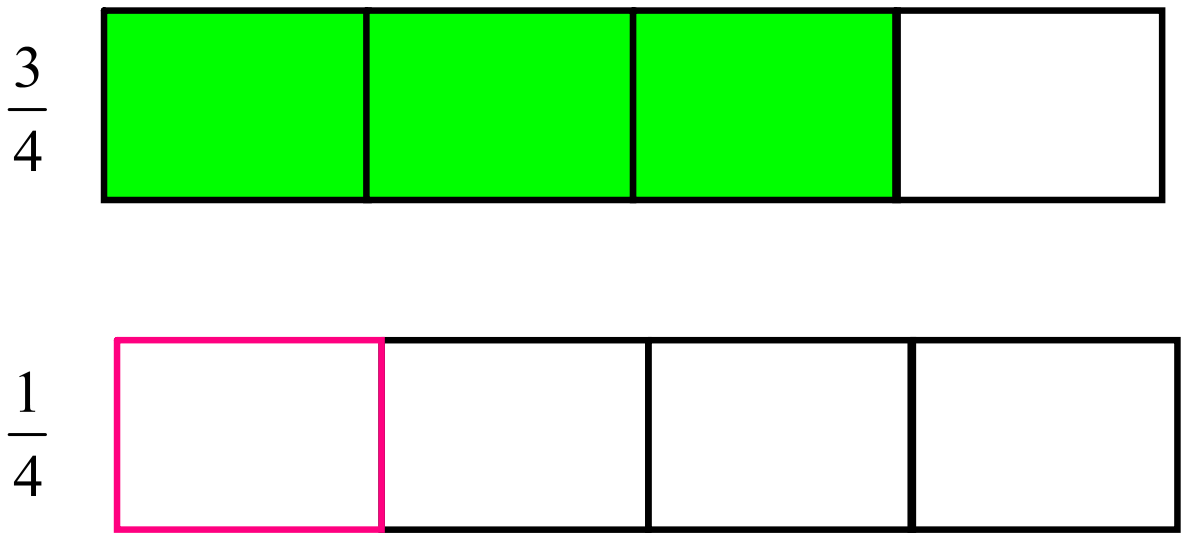
Example

Use the model below to evaluate: $\frac{3}{4} \div \frac{1}{8}$



5 Evaluate the following problem using the model below.

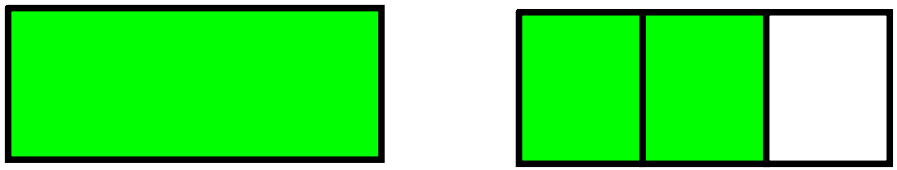
$$\frac{3}{4} \div \frac{1}{4}$$

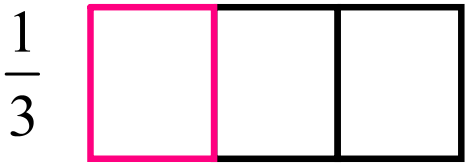


Answer

6 Evaluate the following problem using the model below.

$$1\frac{2}{3} \div \frac{1}{3}$$





Answer

Vocabulary Review

Complex Fraction: A fraction with another fraction in the numerator, denominator or both.

$$\frac{\frac{5}{1}}{2} \qquad \frac{\frac{3}{4}}{7} \qquad \frac{\frac{1}{8}}{\frac{6}{11}}$$

Reciprocal: The inverse of a number/fraction.

Original Number	$\frac{1}{2}$	4	$\frac{7}{9}$
Reciprocal	2	$\frac{1}{4}$	$\frac{9}{7}$

Patterns

Do you notice a pattern between the division of fractions and their solution?

$$8 \div \frac{1}{2} = 16 \qquad 2 \div \frac{1}{3} = 6 \qquad \frac{3}{4} \div \frac{1}{4} = 3$$

Teacher Notes

If you think about it, we are dividing by a fraction which creates a complex fraction.

You need to eliminate the fraction in the denominator in order to solve the problem.

To do this, multiply the numerator and denominator of the complex fraction by the reciprocal of the denominator (making the denominator = 1).

You can then simplify the fraction by rewriting it without the denominator of 1 and solve the new multiplication problem.

Example

$$\frac{1}{2} \div \frac{2}{3} = \frac{\frac{1}{2}}{\frac{2}{3}} = \frac{\frac{1}{2} \times \frac{3}{2}}{\frac{2}{3} \times \frac{3}{2}} = \frac{\frac{1}{2} \times \frac{3}{2}}{1} = \frac{1}{2} \times \frac{3}{2}$$

Original Problem

Complex Fraction

Multiply by Reciprocal

Simplify Denominator

Rewrite Without 1

There are rules that can be applied to fraction division problems to eliminate steps from this lengthy procedure.

source - http://www.helpwithfractions.com/dividing-fractions.html

Dividing Fractions Algorithm

Algorithm

Step 1: Leave the first fraction the same.

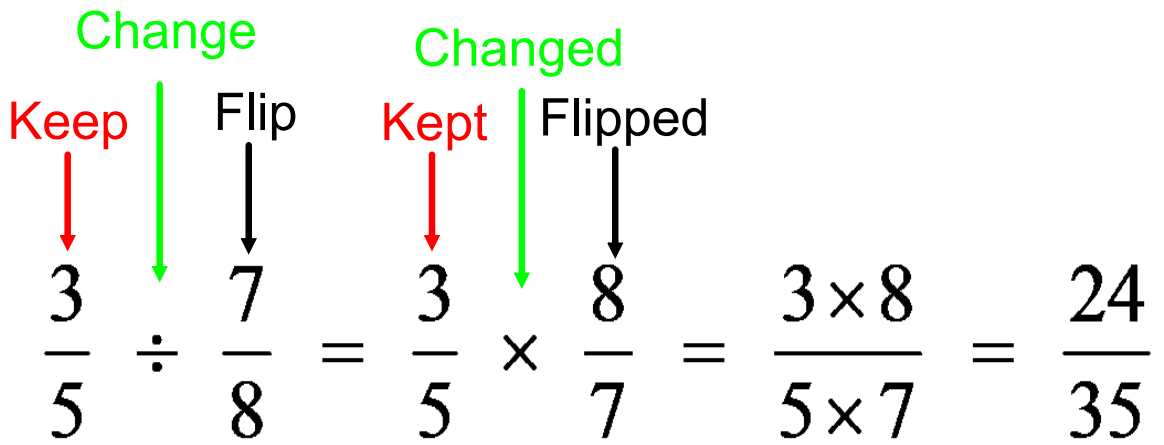
Step 2: Multiply the first fraction by the reciprocal of the second fraction.

Step 3: Simplify your answer.

$$\frac{1}{5} \div \frac{1}{2} = \frac{1}{5} \times \frac{2}{1} = \frac{1 \times 2}{5 \times 1} = \frac{2}{5}$$

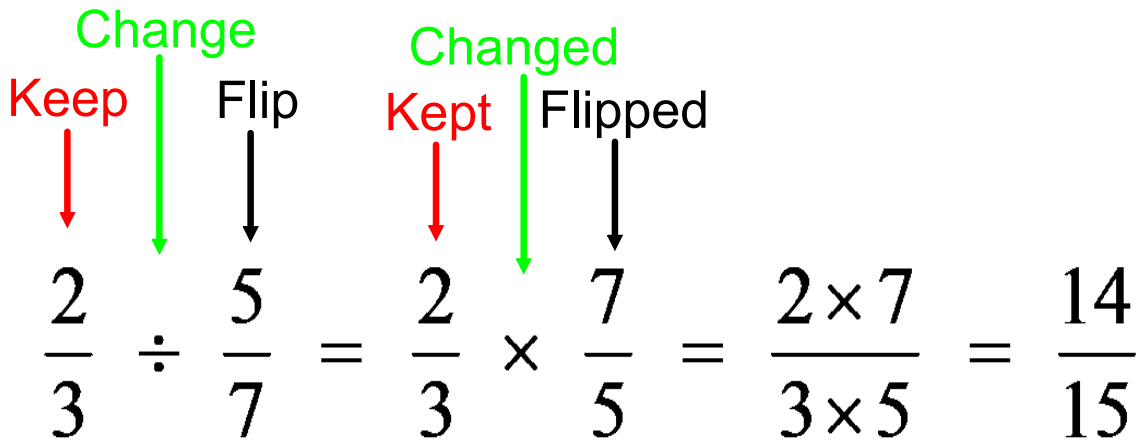
Dividing Fractions Algorithm

Some people use the saying "Keep Change Flip" to help them remember the algorithm.



Example

Evaluate: $\frac{2}{3} \div \frac{5}{7}$



Checking Your Answer

To check your answer, use your knowledge of fact families.

$$\frac{3}{5} \div \frac{7}{8} = \frac{24}{35}$$

$$\frac{3}{5} = \frac{7}{8} \times \frac{24}{35}$$

$$\frac{3}{5} \ is \ \frac{7}{8} \ of \ \frac{24}{35}$$

7 $\frac{4}{5} \div \frac{8}{10} = \frac{5}{4} \times \frac{8}{10}$

True

False

Answer

8 $\frac{3}{4} \div \frac{2}{7} = 2\frac{7}{8}$

True

False

Answer

9 $\frac{4}{5} \div \frac{8}{10} =$

A 1

B $\frac{39}{40}$

C $\frac{40}{42}$

Answer

10 What is the value of $\frac{5}{6} \div \frac{3}{7}$?

A $\frac{15}{42}$

B $\frac{18}{35}$

C $\frac{35}{18}$

D $\frac{42}{15}$

Answer

From NY 2015 Released Questions

11 $\frac{7}{8} \div \frac{3}{2} =$

Answer

12 $\frac{2}{5} \div \frac{1}{3} =$

Answer

Simplify

Sometimes you can **cross simplify** prior to multiplying.

without cross simplifying

$$\frac{3}{4} \div \frac{9}{10} =$$

$$\frac{3}{4} \cdot \frac{10}{9} =$$

$$\frac{30}{36} = \frac{5}{6}$$

with cross simplifying

$$\frac{3}{4} \div \frac{9}{10} =$$

$$\frac{\cancel{3}^{1}}{\cancel{4}_{2}} \cdot \frac{\cancel{10}^{5}}{\cancel{9}_{3}} =$$

$$\frac{30}{36} = \frac{5}{6}$$

13 Can this problem be cross simplified?

Yes $\frac{7}{9} \div \frac{2}{3} =$

No $\frac{7}{9} \cdot \frac{3}{2}$

Answer

14 Can this problem be cross simplified?

Yes

No

$$\frac{6}{7} \div \frac{7}{9} =$$

$$\frac{6}{7} \cdot \frac{9}{7}$$

Answer

15 Can this problem be cross simplified?

Yes $\frac{5}{8} \div \frac{8}{9} =$

No $\frac{5}{8} \cdot \frac{9}{8}$

Answer

16 Can this problem be cross simplified?

Yes

No

$$\frac{7}{10} \div \frac{21}{25} =$$

$$\frac{7}{10} \cdot \frac{25}{21}$$

Answer

17 $\frac{3}{16} \div \frac{1}{4} =$

Answer

18 $\frac{8}{9} \div \frac{2}{5} =$

Answer

19 $\frac{4}{15} \div \frac{3}{5} =$

Answer

20 $\frac{10}{13} \div \frac{30}{37} =$

Answer

Visual Model

A mixed number can be divided by a mixed number using the following visual model.

$$1\frac{1}{2} \div 2\frac{2}{3} =$$

First find the least common denominator (LCD) which is 6.

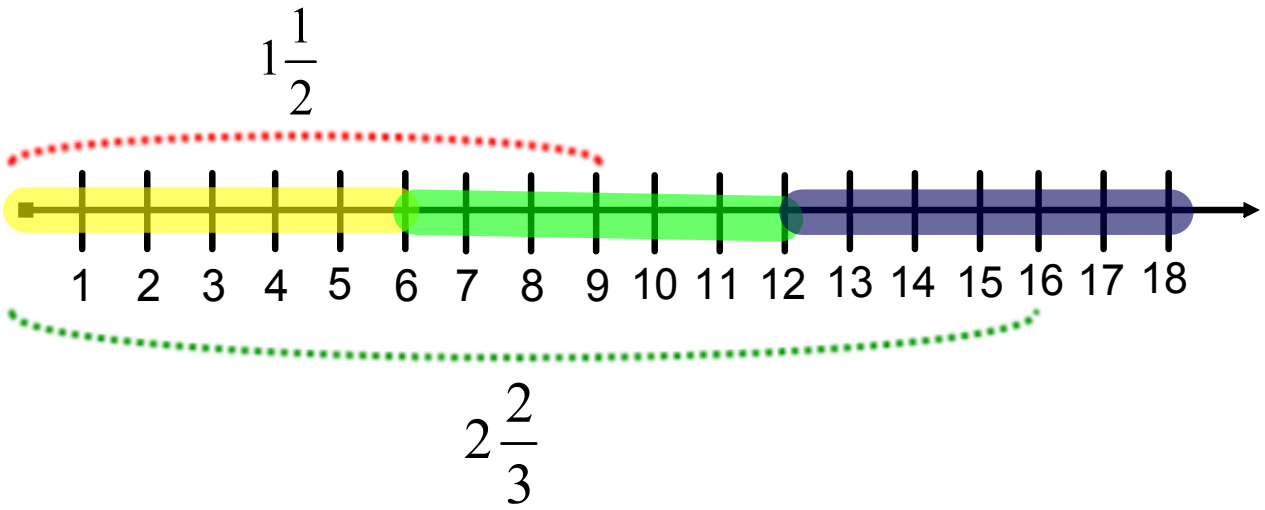
If every 6 lines represents a whole, then how many lines should we draw to make sure both mixed numbers fit?

Answer

Visual Model

Since our LCD is 6, every 6 lines is considered a whole.

$1\frac{1}{2}$ is equivalent to 9 sections on the number line.

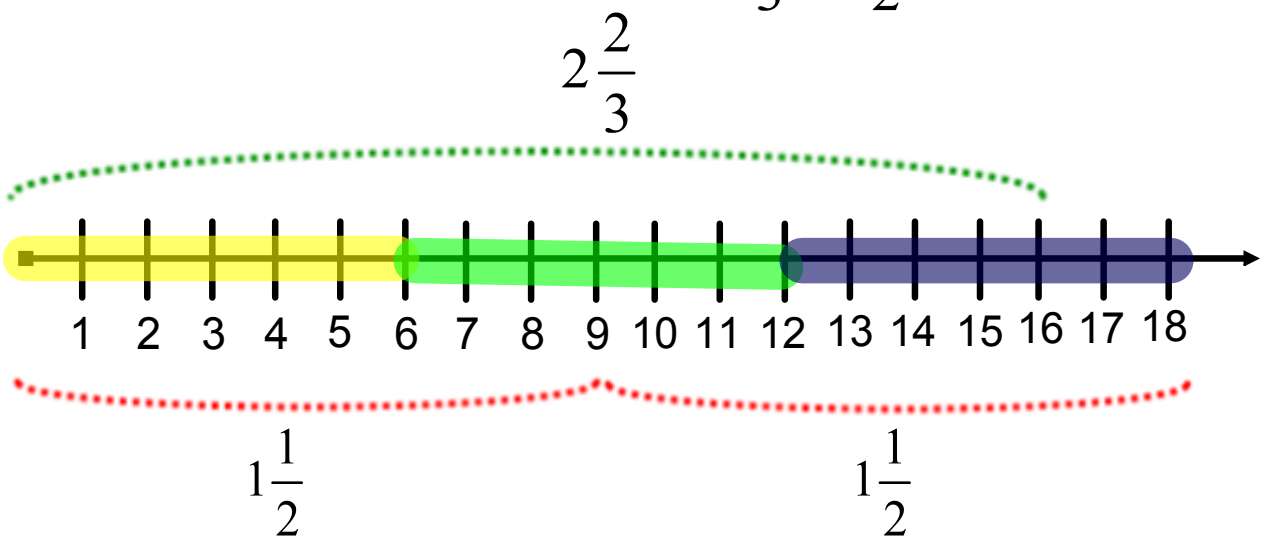


$2\frac{2}{3}$ is equivalent to 16 sections on the number line.

So $1\frac{1}{2} \div 2\frac{2}{3} = \frac{9}{16}$

Visual Model

What if the problem were written as $2\frac{2}{3} \div 1\frac{1}{2} = ?$



How many times does $1\frac{1}{2}$ divide into $2\frac{2}{3}$?

$$\frac{9}{9} + \frac{7}{9} = 1\frac{7}{9}$$

Dividing Mixed Numbers Algorithm

Step 1: Rewrite the Mixed Number(s) as an improper fraction(s).
(write whole numbers / 1)

Step 2: Follow the same steps for dividing fractions

$$6 \div 1\frac{1}{2} = \frac{6}{1} \div \frac{3}{2} = \frac{6}{1} \times \frac{2}{3} = \frac{12}{3} = 4$$

Example

Evaluate: $1\frac{2}{3} \div 3\frac{1}{2}$

$$1\frac{2}{3} \div 3\frac{1}{2} = \frac{5}{3} \div \frac{7}{2} = \frac{5}{3} \times \frac{2}{7} = \frac{10}{21}$$

21 $1\frac{1}{2} \div 2\frac{2}{3} =$

Answer

22 $2\frac{1}{2} \div 5 =$

Answer

23 $4\frac{2}{5} \div 5\frac{1}{2} =$

Answer

24 $3\frac{1}{2} \div 2\frac{3}{8} =$

Answer

Application Problem

Winnie needs pieces of string for a craft project. How many $\frac{1}{6}$ yd pieces of string can she cut from a piece that is $\frac{2}{3}$ yd long?

$$\frac{2}{3} \div \frac{1}{6}$$

$$\frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = \frac{4}{1} \quad 4 \ \textit{pieces}$$

or

$$\frac{\cancel{2}}{\cancel{3}_{1}} \times \frac{\cancel{6}^{2}}{1} = \frac{4}{1} = 4 \ \textit{pieces}$$

Application Problem

One student brings $\frac{1}{2}$ yd of ribbon. If 3 students receive an equal length of the ribbon, how much ribbons will each student receive?

$$\frac{1}{2} \div 3$$

$$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6} \text{ yards of ribbon}$$

Application Problem

Kristen is making a ladder and wants to cut ladder rungs from a 6 ft board. Each rung needs to be $\frac{3}{4}$ ft long. How many ladder rungs can she cut?

$$6 \div \frac{3}{4}$$

$$\frac{6}{1} \div \frac{3}{4}$$

$$\frac{6}{1} \times \frac{4}{3} = \frac{24}{3} = \frac{8}{1} = 8 \text{ rungs}$$

Application Problem

A box weighing $9\frac{1}{3}$ lb contains toy robots weighing $1\frac{1}{6}$ lb apiece. How many toy robots are in the box?

$$9\frac{1}{3} \div 1\frac{1}{6}$$

$$\frac{28}{3} \div \frac{7}{6}$$

$$\frac{\overset{4}{\cancel{28}}}{\underset{1}{\cancel{3}}} \times \frac{6}{\underset{1}{\cancel{7}}}^{2} = \frac{8}{1} = 8 \text{ robots}$$

25 Robert bought $\frac{3}{4}$ pound of grapes and divided them into 6 equal portions. What is the weight of each portion?

A 8 pounds

B $4\frac{1}{2}$ pounds

C $\frac{2}{5}$ pounds

D $\frac{1}{8}$ pounds

Answer

26 A car travels $83\frac{7}{10}$ miles on $2\frac{1}{4}$ gallons of fuel. Which is the best estimate of the number miles the car travels on one gallon of fuel?

A 84 miles

B 62 miles

C 42 miles

D 38 miles

Answer

27 One tablespoon is equal to $\frac{1}{16}$ cup. It is also equal to $\frac{1}{2}$ ounce. A recipe uses $\frac{3}{4}$ cup of flour. How many tablespoons of flour does the recipe use?

A *48* tablespoons

B *24* tablespoons

C 12 tablespoons

D 6 tablespoons

Answer

28 A bookstore packs 6 books in a box. The total weight of the books is $14\frac{2}{5}$ pounds. If each book has the same weight, what is the weight of one book?

A $\frac{5}{12}$ pound

B $2\frac{2}{5}$ pounds

C $8\frac{2}{5}$ pounds

D $86\frac{2}{5}$ pounds

Answer

29 Omar has $2\frac{3}{4}$ cups of dough to make dumplings. If he uses $\frac{3}{16}$ cup of dough for each dumpling, how many whole dumplings can Omar make?

A 13

B 14

C 15

D 16

Answer

From NY 2015 Released Questions

30 There is $\frac{11}{12}$ gallon of distilled water in the class science supplies. If each pair of students doing an experiment uses $\frac{1}{16}$ gallon of distilled water, there will be $\frac{1}{6}$ gallon left in the supplies . How many students are doing the experiments?

Answer

31 Carol makes $9\frac{1}{3}$ cups of snack mix. She puts all the snack mix into plastic bags. She puts $\frac{2}{3}$ cup of the snack mix in each bag. How many plastic bags does Carol need?

Enter your answer in the box.

 bags

Answer & Math Practice

From PARCC EOY sample test non-calculator #9

32 **Part A**

A group of hikers buy 8 bags of trail mix. Each bag contains $3\frac{1}{2}$ cups of trail mix. The trail mix is shared evenly among 12 hikers. How many cups of trail mix will each hiker receive? Show your work or explain your answer.

Answer

From PARCC PBA sample test calculator #10

33 **Part B**

The hikers plan to visit a scenic lookout. They will rest after they hike 2 miles. Then they will hike the remaining $1\frac{3}{4}$ miles to the lookout. The trail the hikers will use to return from the lookout is $\frac{1}{2}$ mile shorter than the trail they will use to go to the lookout. Each hiker will bring $\frac{1}{4}$ gallon of water for each mile to and from the lookout.

- Determine the total distance each hiker will hike. Show your work or explain your answer.

Answer

From PARCC PBA sample test calculator #10

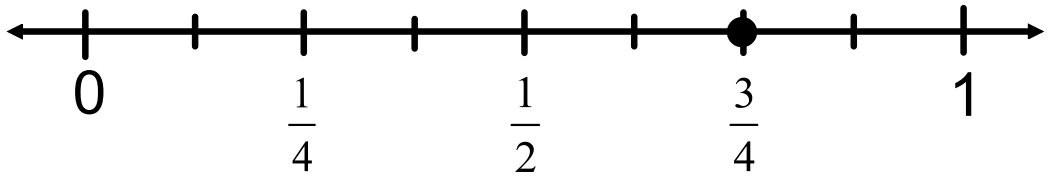
34 **Part B (continued)**

- Determine the total number of gallons of water each hiker will bring. Show your work or explain your answer.

Answer

From PARCC PBA sample test calculator #10

35 This diagram shows a number line.



Part A

James has a board that is $\frac{3}{4}$ foot long. He wants to cut the board into pieces that are each $\frac{1}{8}$ foot long. How many pieces can James cut from the board? Explain how James can use the number line diagram to determine the number of pieces he can cut from the board.

Answer

From PARCC PBA sample test calculator #8

36 Part B

Write an equation using division that represents how James can find the number of pieces he can cut from the board.

Answer

From PARCC PBA sample test calculator #8

Long Division Review

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Division Terms to Remember

- The number to be divided into is known as the dividend
- The number which divides the other number is known as the divisor
- The answer to a division problem is called the quotient

$20 \div 5 = 4$

$$\begin{array}{r} 4 \text{ quotient} \\ \text{divisor } 5 \overline{)\ 20 \text{ dividend}} \end{array}$$

$$\frac{20}{5} = 4$$

When we are dividing, we are breaking apart into equal groups

Example 1

Find $132 \div 3$

Click for step 1

$$3\overline{)132}$$

Click for step 2

Step 3: Check your answer.

$$\begin{array}{r} 44 \\ \times\ 3 \\ \hline \end{array}$$

click

Estimating Your Answer

Before any calculations, estimate your answer to make sure you are on the right track.

$$357 \div 15$$

What place value should we round to?

click

357 rounds to _____

15 rounds to _____

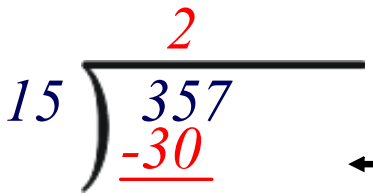
Our answer should approximately be ...

click

Example 2

(change pages to see each step)

Step 1: Can 15 go into 3, no so can 15 go into 35, yes



$15 \times 2 = 30$

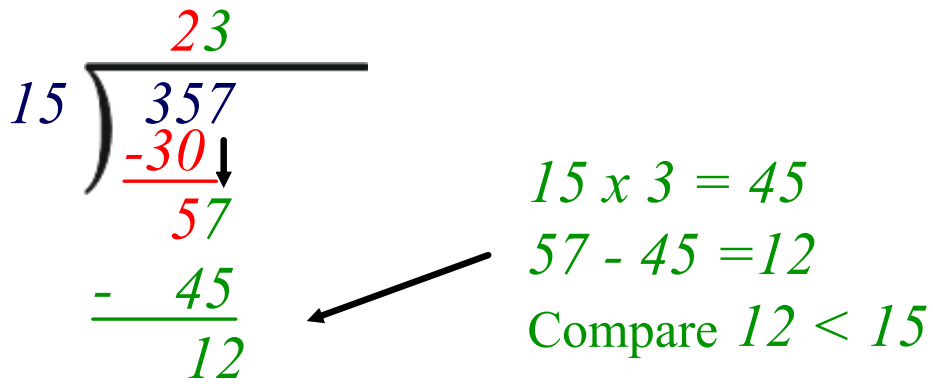
$35 - 30 = 5$

Compare $5 < 15$

Example 2

(change pages to see each step)

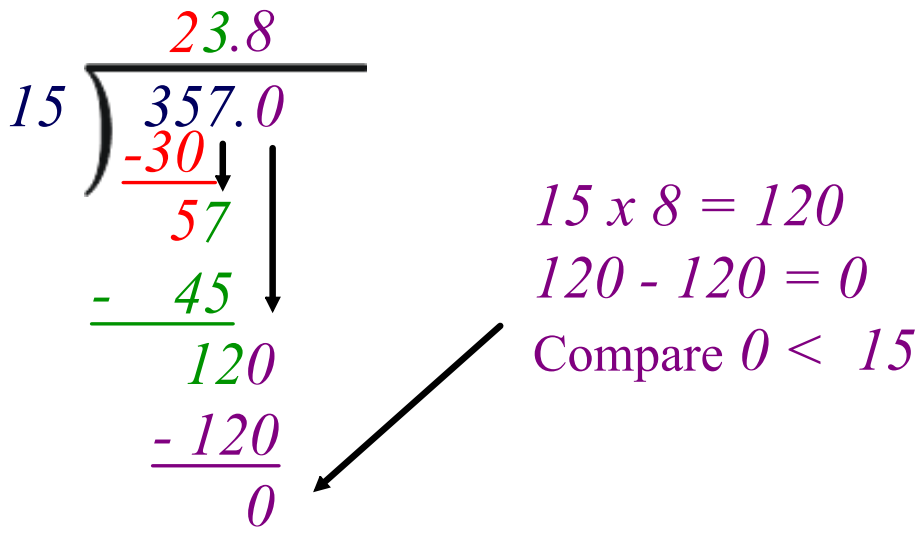
Step 2: Bring down the 7. Can 25 go into 207, yes



Example 2

(change pages to see each step)

Step 3: You need to add a decimal and a zero since the division is not complete. Bring the zero down and continue the long division.



Is our answer close to our estimate?

Check your answer.

$$\begin{array}{r} 23.8 \\ \times \quad 15 \\ \hline \end{array}$$

click

Estimate

Discuss your answers with your group.

$697 \div 17$ click

$9396 \div 29$ click

$312 \div 16$ click

$580 \div 25$ click

Solve

Discuss your answers with your group.

click

$697 \div 17$

click

$9396 \div 29$

click

$312 \div 16$

click

$580 \div 25$

37 Estimate the quotient.

$779 \div 19$

Answer

38 Compute.

$779 \div 19$

Answer

39 Estimate the quotient.

$1{,}551 \div 55$

Answer

40 Compute.

$1{,}551 \div 55$

Answer

41 Estimate the quotient.

$1{,}288 \div 35$

Answer

42 Compute.

$1{,}288 \div 35$

Answer

43 The school concert hall contains 312 chairs in 12 rows.
Estimate how many chairs are in each row.

Answer

44 The school concert hall contains 312 chairs in 12 rows.
How many chairs are in each row?

Answer

45 Compute.

$4706 \div 104 =$

Answer

46 The local Italian restaurant receives the same number of visitors every day. If 343 people visit the restaurant over the course of one week, how many visitors visit each day?

Answer

47 Compute.

$1032 \div 24 =$

Answer

48 Compute.

$4922 \div 92 =$

Answer

49 Enter your answer in the box.

$34{,}992 \div 81 =$

Answer

From PARCC EOY sample test non-calculator #18

Adding Decimals

Return to Table of Contents

Adding Decimals

If you know how to add whole numbers then you can add decimals. Just follow these few steps.

Step 1: Put the numbers in a **vertical** column, aligning the decimal points.

Step 2: Add each column of digits, starting on the right and working to the left.

Step 3: Place the decimal point in the answer directly below the decimal points that you lined up in Step 1.

Adding Decimals

When adding or subtracting decimals, always remember to align the decimals vertically...

$$
\begin{array}{r}
0.25 \\
0.25 \\
0.25 \\
0.25 \\
+\ 1.00 \\
\hline
\end{array}
$$

Math Practice

Estimating Your Answer

Before any calculations, estimate your answer to make sure you are on the right track.

$$5.1 + 1.25 + 0.04 + 1.99$$

What place value should we round to?

click

5.1 rounds to _____

1.25 rounds to _____

0.04 rounds to _____

1.99 rounds to _____

Our answer should approximately be ...

click

Adding Decimals

Now, try this - Don't forget - LINE THEM UP

$$5.1 + 1.25 + 0.04 + 1.99$$

Click

Try These

Estimate the following sums in your notebook. Check with the rest of your group.

1) $8.23 + 4.125 + 0.1189$

click

2) $3.178 + 12.28 + 9$

click

3) $17.009 + 2.965 + 8.4$

click

4) $9.999 + 3.1567 + 4.5656$

click

Try These

Complete in your notebook then check with the rest of your group.

1) $8.23 + 4.125 + 0.1189$

click

2) $3.178 + 12.28 + 9$

click

3) $17.009 + 2.965 + 8.4$

click

4) $9.999 + 3.1567 + 4.5656$

click

Math Practice

50 Add the following:

$0.6 + 0.55 =$

A 6.1

B 0.115

C 1.15

D 0.16

Answer

51 Joanne and Peter are working together to solve the problem $0.6 + 0.55$. Joanne says that the sum should be approximately 2. Peter disagrees and says the sum should be approximately 0. Who is correct? Why?

A Joanne

B Peter

Answer

52 Find the sum.

$1.025 + 0.03 + 14.0001 =$

Answer

53 Franco went to buy new video games. He bought MaxRush for $19.95, Duplo Race for $23.95 and Garage Mate for $21.95. Estimate how much Franco spent on the video games.

Answer

54 Franco went to buy new video games. He bought MaxRush for $19.95, Duplo Race for $23.95 and Garage Mate for $21.95. How much did he spend on video games?

Answer

55 What is the sum of
12.034 and 0.0104?

A 12.1344

B 12.0444

C 12.138

D 1.20444

Answer

56 Estimate the sum.

$8.5 + 0.042 + 12.31$

A 20

B 21

C 22

D 23

Answer

57 Find the sum.

$8.5 + 0.042 + 12.31 =$

A 13.58

B 21.23

C 20.852

D 20.14

Answer

58 Five students collected paper to be recycled. Shelly's stack was .008 cm. thick; Ken's stack was .125 cm. thick; Joe's stack was .150 cm. thick; Betty's stack was .185 cm. thick; Mary's stack was .005 cm. thick. What was the thickness of the papers collected to be recycled?

A .561 cm.

B .452 cm.

C .480 cm.

D .473 cm.

Answer

59 Find the sum.

$5 + 100.145 + 57.8962 + 2.312 =$

Answer

60 What is the sum of 74.835 and 2.67?

Enter your answer in the box.

Answer

From PARCC EOY sample test non-calculator #19

Web Link

Let's go to Cool Math and practice addition.

Cool Math Link

Subtracting Decimals

Return to Table of Contents

Subtracting Decimals

If you know how to subtract whole numbers then you can subtract decimals. Just follow these few steps.

Step 1: Put the numbers in a vertical column, aligning the decimal points.

$$\begin{array}{r} 1.1 \\ -\ 0.3 \\ \hline \end{array}$$

Step 2: Subtract the numbers from right to left using the same rules as whole numbers.

$$\begin{array}{r} {}^{0}\not{1}.{}^{1}1 \\ -\ 0.3 \\ \hline 0.8 \end{array}$$

Step 3: Place the decimal point in the answer directly below the decimal points that you lined up in Step 1.

Estimating Your Answer

Before any calculations, estimate your answer to make sure you are on the right track.

21.7 - 8.21

What place value should we round to?

click

21.7 rounds to _____

8.21 rounds to _____

Our answer should approximately be ...

click

Subtracting Decimals

What do we do if there aren't enough decimal places when we subtract?

21.7 - 8.21

Don't forget...Line Them Up!

Click

Try These

Estimate the following differences in your notebook. Then check with the rest of your group.

1) $8.23 - 0.1189$

click

2) $12.283 - 9.025$

click

3) $17.009 - 8.4$

click

4) $9.999 - 4.5656$

click

Try These

Complete in your notebook then check with the rest of your group.

1) $8.23 - 0.1189$

click

2) $12.283 - 9.025$

click

3) $17.009 - 8.4$

click

4) $9.999 - 4.5656$

click

Math Practice

61

$5 - 0.238 =$

Answer

62

$12.809 - 4 =$

Answer

63 Sally won $25.00 for her science fair project. Her project cost $12.57 to prepare. What is the estimate of Sally's profit?

A $20

B $18

C $13

D $12

Answer

64 Sally won $25.00 for her science fair project. Her project cost $12.57 to prepare. How much did Sally actually make as a **profit**?

A $37.57

B $12.43

C $13.57

D $12.00

Answer

65

$$1897.112 - 0.647 =$$

Answer

66 The Johnson twins raced each other in the 200-meter dash. Jordan finished in 23.48 seconds, and Max finished in 26.13 seconds. How much faster was Jordan than Max?

Answer

67 Timothy is working on the problem $4.1 - 0.094$. He estimates his answer before solving and rounds the numbers to the nearest tenths. He uses 4.1 and 0.1 to estimate the answer. Is he correct in doing so? Why or why not?

Yes

No

Answer

68

4.1 - 0.094=

Answer

69

$$17 - 13.008 =$$

Answer

70 Which problem below would give you two different estimates when you either round to the nearest whole or round to the nearest tenths?

A *27.85 - 12.91*

B *14.17 - 8.2*

C *7.9 - 3.88*

D *21.25 - 18.16*

Answer

71 If you buy two movie tickets for $8.25 each, what will your change be from $20?

Answer

Web Link

Let's go to Cool Math and practice subtraction.

Cool Math Link

The Distributive Property and the Product of Decimals

Return to Table of Contents

Multiplication

If you know how to multiply whole numbers then you can multiply decimals. Just follow these few steps.

Step 1: Ignore the decimal points.

Step 2: Multiply the numbers using the same rules as whole numbers.

Step 3: Count the total number of digits to the right of the decimal point. Put that many digits to the right of the decimal point in your answer.

Distributive Property

Evaluate *200 x 41.5*

click

We can also use the **distributive property** to calculate the product.

Math Practice

Click

Distributive Property

Evaluate 400×18.33

$400 \times (\_\_\_\_\_ + \_\_\_\_\_)$

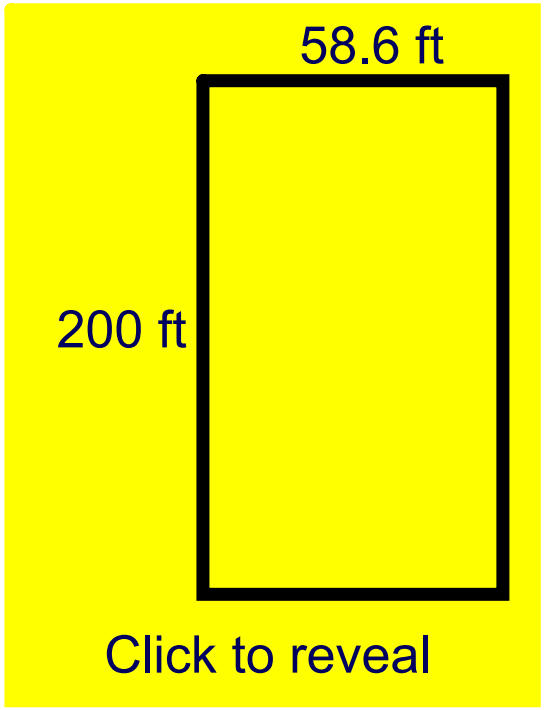
$(400 \times \_\_\_\_\_) + (400 \times \_\_\_\_\_)$

$\_\_\_\_\_ + \_\_\_\_\_ = \square$

This method is known as partial products.

Distributive Property

How can we use partial products to calculate the area of the rectangle shown below?



200 x *58.6*

200 x (_____ + _____)

(*200* x _____) + (*200* x _____)

_____ + _____ = *11,720*

Teacher Notes

72 $12(43) = 12(40) \times 12(3)$

True

False

Answer

73 Use the distributive property to rewrite the expression.

$3(76.8)$

Answer

74 Calculate the product using partial products.

5(48)

Answer

75 Calculate the product using partial products.

13(5.2)

Answer

76 Calculate the product using partial products.

$300(7.4)$

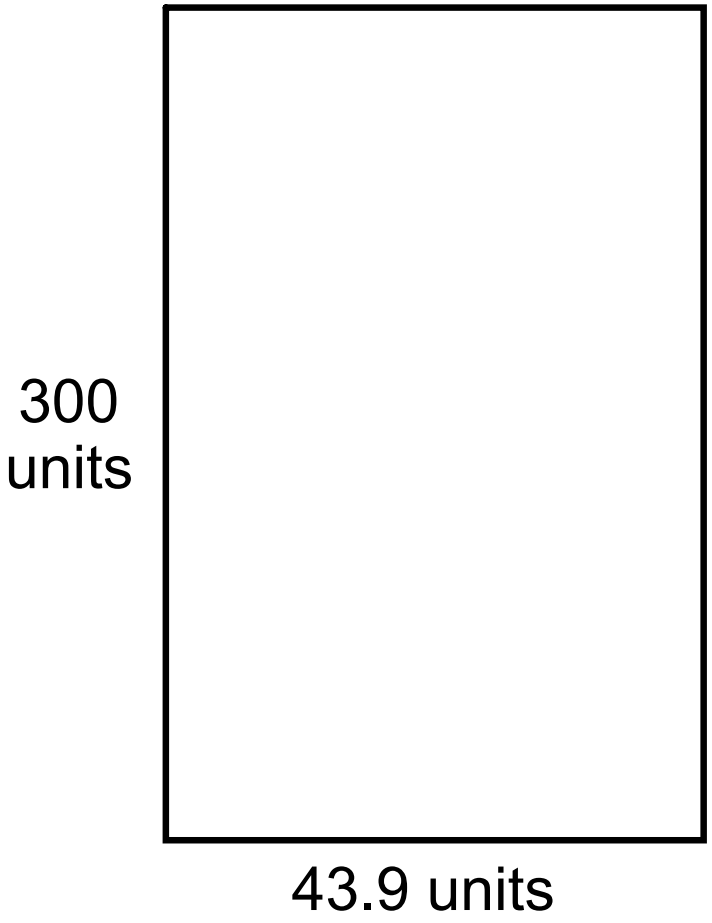
Answer

77 Calculate the product using partial products.

200(6.5)

Answer

78 Calculate the area of the rectangle using partial products.



Answer

Multiplying Decimals

Return to Table of Contents

Multiplication

Convert the following decimal numbers into fractions.

$$0.7 \times 0.09$$

What is the product?

click $\frac{63}{100}$

We multiplied seven tenths by nine hundredths.
What place value will the last digit in the product be in if we convert it into a decimal number?

click

Try These!

What place value will the last digit be in for the following problems? Don't forget to convert them to fractions first.

	Fractions	Product	Place Value
1) 0.3×0.7			
2) 0.2×0.13			
3) 0.08×0.231			

Multiplication

Do you notice a pattern for multiplying decimals?

$$3.5 \times 1.72$$

$$3\frac{5}{10} \times 1\frac{72}{100}$$

$$\frac{35}{10} \times \frac{172}{100}$$

$$\frac{6020}{1000}$$

Where does the decimal point go? Drag the decimal point.

6 0 2 0

Multiplication

If you know how to multiply whole numbers then you can multiply decimals. Just follow these few steps.

Step 1: Ignore the decimal points.

Step 2: Multiply the numbers using the same rules as whole numbers.

Step 3: Count the total number of digits to the right of the decimal points in both numbers. Put that many digits to the right of the decimal point in your answer.

Multiplication

$$
\begin{array}{rl}
3.21 & \} \text{ 2 digits} \\
\times\ .04 & \} \text{ 2 digits} \\
\hline
.1284 &
\end{array}
$$

There are a total of four digits to the right of the decimal points.

There must be four digits to the right of the decimal point in the answer.

Estimate Your Answer

Before any calculations, estimate your answer to make sure you are on the right track.

23.2 x 4.04

What place value should we round to?

click

23.2 rounds to ____

4.04 rounds to ____

Our answer should approximately be ...

click

Exact Answer

$$
\begin{array}{rl}
 & 23.2 \} \text{ 1 digit} \\
\times & 4.04 \} \text{ 2 digits} \\
\hline
 & 928 \\
 & 0000 \\
 & 92800 \\
\hline
 & 93.728
\end{array}
$$

There are a total of three digits to the right of the decimal points.

There must be three digits to the right of the decimal point in the answer.

Estimating helps us recognize where the decimal point belongs!

Estimate Your Answer

Estimate your answer for the following problem by rounding the numbers to the nearest whole number.

$$9.5 \times 0.05$$

9.5 rounds to _____

0.05 rounds to _____

What is your estimate?

For problems like these, use your number sense!

You are multiplying 9.5 by 0.05 which means you are taking a part (fraction) of 9.5.

So your answer must be smaller than click

Practice

Estimate the following products in your notebook then check with the rest of your group.

1) 14.512×4.21

click

2) 8.31×1.008

click

3) 7.0045×5.2

click

4) 3.214×0.0034

click

Practice

Complete in your notebook then check with the rest of your group.

1) 14.512×4.21

click

2) 8.31×1.008

click

3) 7.0045×5.2

click

4) 3.214×0.0034

click

Math Practice

79 Estimate the product.

0.42×0.032

A The product will be less than 1

B The product will be equal to 1

C The product will be greater than 1

Answer

80 The product of 0.42 x 0.032 will have 4 digits to the right of the decimal point.

True

False

Answer

81 Multiply 0.42×0.032

Answer

82 Multiply 3.452×2.1

Answer

83 You need to buy 6 notebooks that cost $0.87 each. If you have $5, do you have enough money?

Estimate to determine your answer. Do not solve.

Yes

No

Answer

84 You need to buy 6 notebooks that cost $0.87 each.
How much will this cost?

Answer

85 Multiply 53.24×0.089

Answer

86 The regular price of a pair of jeans is $29.99. Mrs. Jones has four children for whom she must buy new jeans. The jeans are on sale for $22.50.

What would the total cost be of four pairs of jeans on sale?

A $119.96

B $90.00

C $86.00

D $52.49

Answer

87 How many digits will be to the right of decimal point in the product for the problem 4.0156×7.8?

A 2

B 3

C 4

D 5

Answer

88 Multiply *4.0156* x *7.8*

Answer

89 Multiply 0.012 x 0.21

Answer

90 Enter your answer in the box.

$18.3 \times 4.39 =$

Answer

From PARCC EOY sample test non-calculator #7

91 Thomas buys a case of bottled water. A case contains 36 bottles of water and costs $4.69. Thomas will sell each bottle of water for $0.75 at a school event.

How much profit, in dollars, will Thomas earn if he sells all the bottles of water?

Enter your answer in the box.

$ ☐

Answer & Math Practice

From PARCC EOY sample test non-calculator #17

Dividing Decimals

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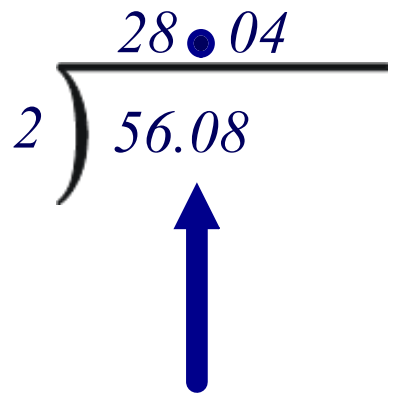
Divide Decimals by Whole Numbers

Step 1: Use long division.

Step 2: Bring the decimal point up into the quotient.



Try This!

$12.45 \div 5 =$

Answer

The Power of Ten

Multiplying by a power of ten makes dividing by decimals easier!

1) $13 \times 10 =$ _____

2) $94 \times 100 =$ _____

3) $28 \times 1000 =$ _____

4) $6.2 \times 10 =$ _____

5) $4.78 \times 100 =$ _____

6) $51.293 \times 1000 =$ _____

Do you see a pattern for multiplying by a power of ten?

Click to Reveal

Math Practice

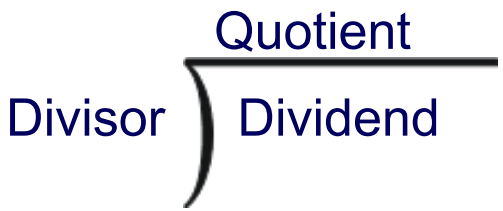
Divide by Decimals

Step 1: Change the divisor to a whole number by multiplying by a **power of 10**.

Step 2: Multiply the dividend by the same power of 10.

Step 3: Use long division.

Step 4: Bring the decimal point up into the quotient.



Power of Ten

Try rewriting these problems so you are ready to divide!

$15.6\overline{)6.24}$ → $156\overline{)62.4}$

Multiply by 10, so that 15.6 becomes 156
6.24 must also be multiplied by 10

$.234\overline{)23.4}$

Click

Power of Ten

Rewrite each problem after multiplying by a power of 10.

1) $250.2 \div 4.15$

click

2) $.008 \overline{)\ 4.2}$

click

3) $0.9 \overline{)\ 678.921}$

click

4) $68.342 \div 2.2$

click

Estimating Your Answer

Before any calculations, estimate your answer to make sure you are on the right track.

$$23.2 \div 4.04$$

What place value should we round to?

click

23.2 rounds to _____

4.04 rounds to _____

Our answer should approximately be ...

click

Try This!

Be sure to round your answer to the thousandths.

$4.04\overline{)23.2}$

click

Estimate

Estimate your answer for the following problem by rounding the numbers to the nearest whole number.

$$9.5 \div 0.05$$

9.5 rounds to _____

0.05 rounds to _____

What is your estimate?

Math Practice

For problems like these, use your number sense!

If you are dividing 9.5 by 0.05, then does that mean the quotient will be smaller than 9.5 or greater than 9.5?

click

92 Divide

$$0.78 \div 0.02 =$$

Answer

93 Use estimation to figure out if the quotient will be

$$4.866 \div 0.6$$

A less than 4.866

B around 4.866

C greater than 4.866

Answer

94

$$0.6\overline{)4.866}$$

Answer

95

10 divided by *0.25* =

Answer

96

$$12.03 \div 0.04 =$$

Answer

97

$$0.012\overline{)24.6}$$

Answer

98 Estimate

$36 \div 1.2$

Answer

99 Evaluate.

$36 \div 1.2 =$

Answer

100 Estimate.

$9.116 \div 2.12$

Answer

101 Evaluate.

$$9.116 \div 2.12 =$$

Answer

102 Enter your answer in the box.

$33.8 \div 32.5 =$ ☐

Answer

From PARCC EOY sample test #2 non-calculator

Terminating and Repeating

There are two types of decimals - terminating and repeating.

A **terminating decimal** is a decimal that ends.
All of the examples we have completed so far are terminating.

A **repeating decimal** is a decimal that continues forever with one or more digits repeating in a pattern.

To denote a repeating decimal, a line is drawn above the numbers that repeat. However, with a calculator, the last digit is rounded.

Terminating or Repeating

Let's consider the following...

$$\frac{1}{3} = 1 \div 3 = 3\overline{)1}$$

Click to Reveal

Teacher Notes

Repeating Example

$$9\overline{)6789.21}$$

Click to Reveal

Repeating Example

$$2200\overline{)68342}$$

Click to Reveal

103

$15.5 \div 0.3$

Answer

104

$$0.8 \div 0.003 =$$

Answer

105 You need to put some gas in your car. Regular gasoline is $3.59 per gallon. You only have a $20 bill on you. How many gallons can you buy?

Answer

106

$25 \div 1.1 =$

A 2.27

B 22.73

C $22.\overline{7}$

D $22.\overline{72}$

Answer

107

$$0.06\overline{)2.8}$$

Answer

108 If 6 people are on an elevator and together they weigh 931.56 pounds, find the **average** weight of each person.

Answer

109

$$0.007 \div 0.9 =$$

Answer

110 Heather has 5.5 lbs of jelly beans. She will put them in 8.5 bags. How much will be in each bag?

Answer

111

$$0.003\overline{)2.83}$$

Answer

112

$$91.84 \div 4.8 =$$

Answer

113 Texas suffered through a heat wave in August 2011. The highest four temperatures (in degrees Fahrenheit) were 103.4, 102.8, 101.9 and 102.5. What was the average temperature for those four days?

Answer

114 For your sewing project at school, you need to purchase 3.5 yards of fabric. You spend $9.10 on one pattern and $8.40 on another. How much does one yard cost?

Answer

115

$9 \div 0.22$

A 40.9

B $40.\overline{90}$

C 40.91

D $40.\overline{9}$

Answer

Glossary & Standards

Teacher Notes

Return to Table of Contents

Algorithm

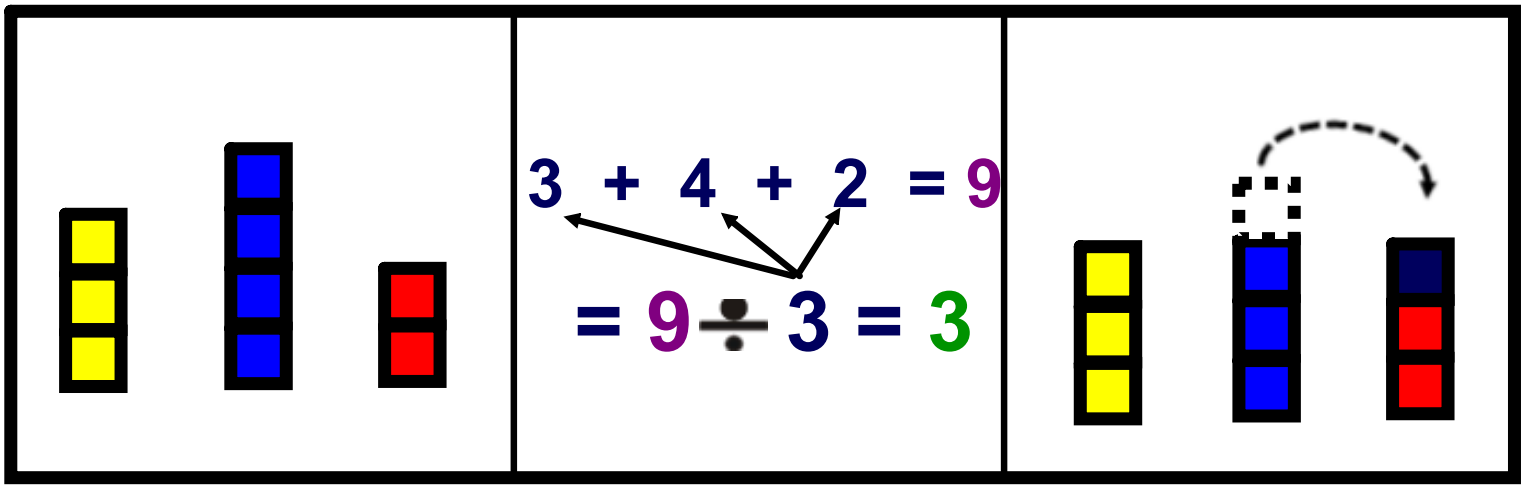
A step-by-step process to find a solution.

How to...	24 + 12 =	It's like a cooking recipe for mathematics.
Step 1: 	Add the ones	
Step 2: 	then add the tens	
Step 3: 		

Back to Instruction

Average

The value/amount of each item
when the total is distributed
across each item equally.



Back to Instruction

Complex Fraction

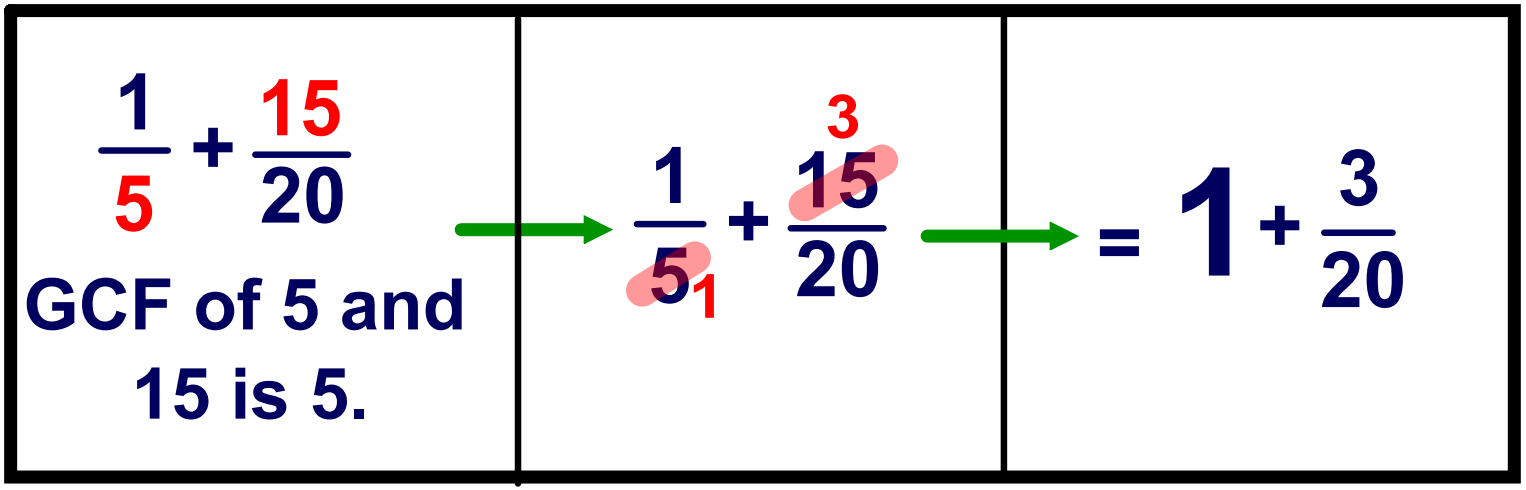
A fraction whose numerator or denominator or both contain fractions.

$\dfrac{3}{\frac{1}{5}} = 3 \div \frac{1}{5}$	$\dfrac{\frac{2}{3}}{\frac{1}{5}} = \frac{2}{3} \div \frac{1}{5}$	$\frac{2}{3} \div \frac{1}{5}$ Must be written as a fraction.

Back to Instruction

Cross Simplify

Used to make operations with fractions easier. Divide the numerator of one fraction and the denominator of another fraction by their GCF.



Back to Instruction

Distributive Property

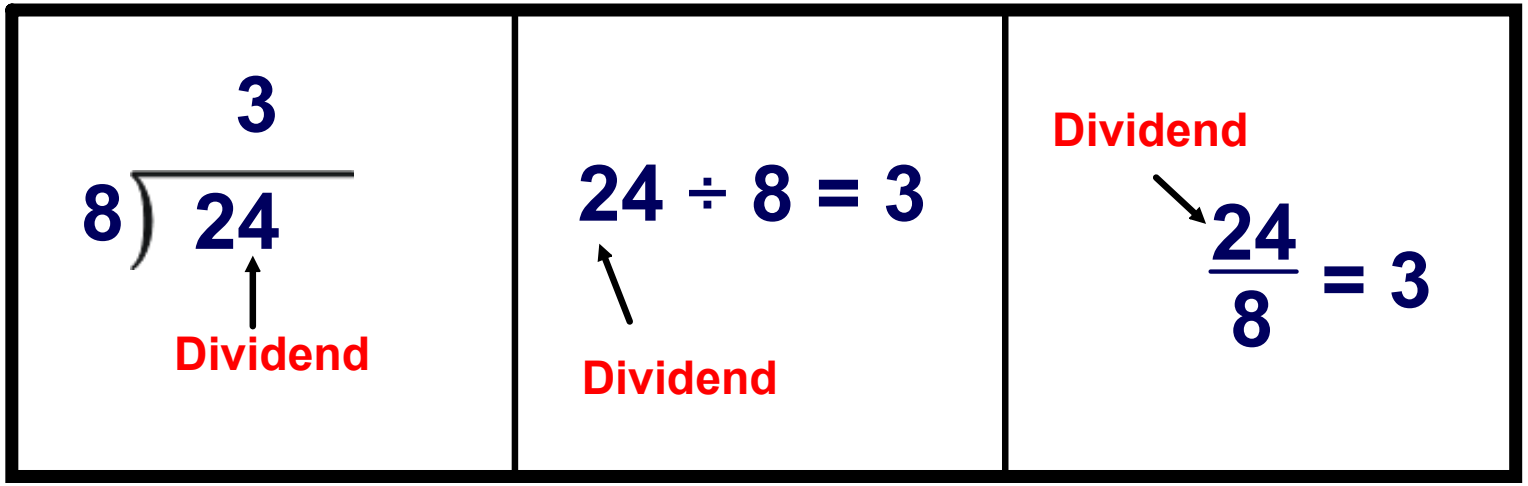
Multiplying a sum by a number is the same as multiplying each addend in the sum by the same number and then adding the products.

5 3  (3 + 2) 3x5=3(3+2)	3 4 2  2(3+4)= (2x3)+(2x4)	also applies to subtraction a(b-c)=ab-ac a(b+c)=ab+ac

Back to Instruction

Dividend

The number being divided
in a division equation.



Back to Instruction

Divisor

The number the dividend is divided by. A number that divides another number without a remainder.

$8\overline{)\,24}$ (3) Divisor	$24 \div 8 = 3$ Divisor	~~$\frac{25}{8} = 3_R1$~~ Must divide evenly.

Back to Instruction

Power of 10

Any integer powers of the number ten.
(Ten is the base, the exponent is the power.)

10 =	10x10 =	10x10x10 =
$10^1 = 10$	$10^2 = 100$	$10^3 = 1{,}000$

Back to Instruction

Profit

The difference between the amount earned and the amount spent.

Earned

- Spent

Profit

$30 Washing Cars

-$12 Supplies

$18 Profit

Back to Instruction

Quotient

The number that is the result of dividing one number by another.

$12 \div 3 = 4$ Quotient	Quotient $3\overline{)\,12}$ with 4 above	$\frac{12}{3} = 4$ Quotient

Back to Instruction

Reciprocal

One of two numbers whose product is one.

$1 \times 1 = 1$ 1 is the reciprocal of 1.	Number $2 \times \frac{1}{2} = 1$ Reciprocal	$r \times r = 1$

Back to Instruction

Repeating Decimal

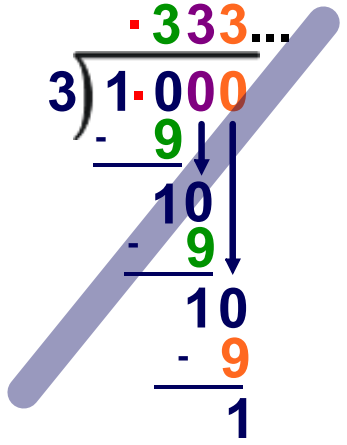
A decimal with a digit or group of digits that repeats endlessly.

$.333\ldots$ $3\overline{)1.000}$ $-\ 9$ 10 $-\ 9$ 10 $-\ 9$ 1	$\frac{1}{3} = .\overline{3}$	$\frac{7}{33} = .\overline{21}$ $(.212121\ldots)$

Back to Instruction

Terminating Decimal

A decimal that ends and doesn't go on forever.

1/2 = .5	3/8 = .375	

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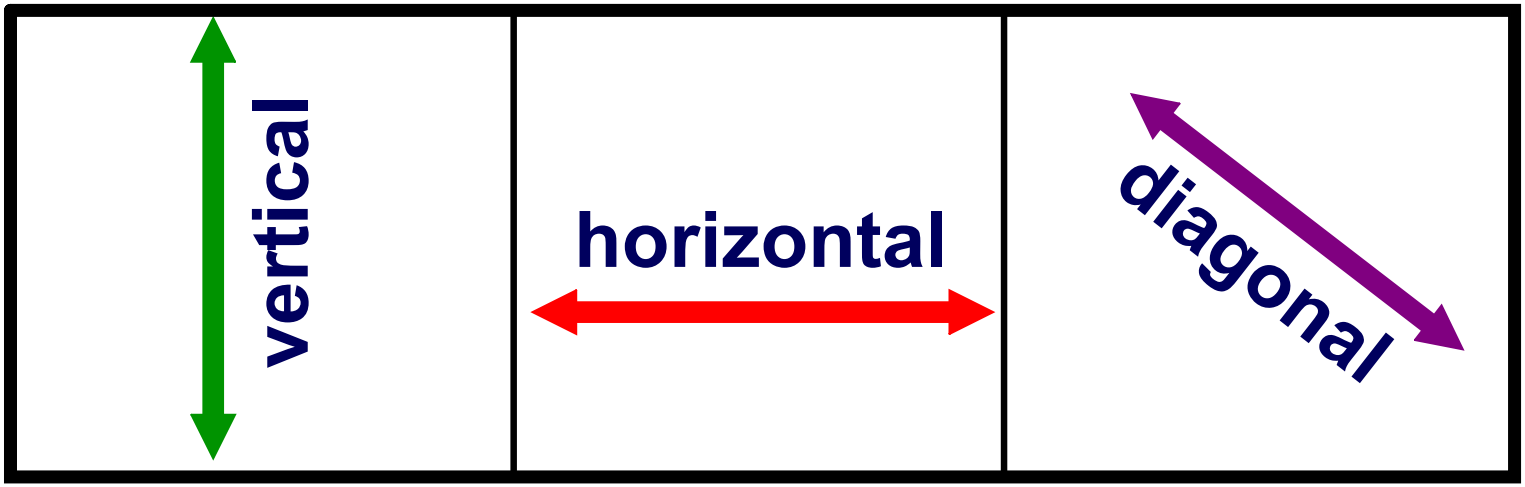
Vertical

In an up-down position.



Back to Instruction

Standards for Mathematical Practices

Throughout this unit, the Standards for Mathematical Practice are used.

MP1: Making sense of problems & persevere in solving them.
MP2: Reason abstractly & quantitatively.
MP3: Construct viable arguments and critique the reasoning of others.
MP4: Model with mathematics.
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP7: Look for & make use of structure.
MP8: Look for & express regularity in repeated reasoning.

Additional questions are included on the slides using the "Math Practice" Pull-tabs (e.g. a blank one is shown to the right on this slide) with a reference to the standards used.

If questions already exist on a slide, then the specific MPs that the questions address are listed in the Pull-tab.

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