

New Jersey Center for Teaching and Learning Progressive Mathematics Initiative®

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5th Grade



Decimal Computation

2014-03-05

www.njctl.org

Decimal Computation Unit Topics

Click on the topic to go to that section

- Decimal Addition
- Decimal Subtraction
- Multiplication of Multi-Digit Numbers
- Decimal Multiplication
- Mixed Word Problems
- · Glossary

Vocabulary words are identified with a dotted underline.

Sometimes when you subtract the fractions, you find that you can't because the first numerator is smaller than the second! When this happens, you need to regroup from the whole number.

(Click on the dotted)

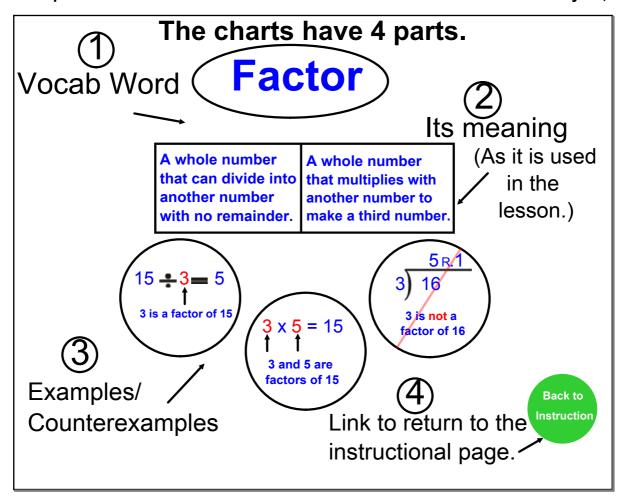
underline.)

How many thirds are in 1 whole?

How many fifths are in 1 whole?

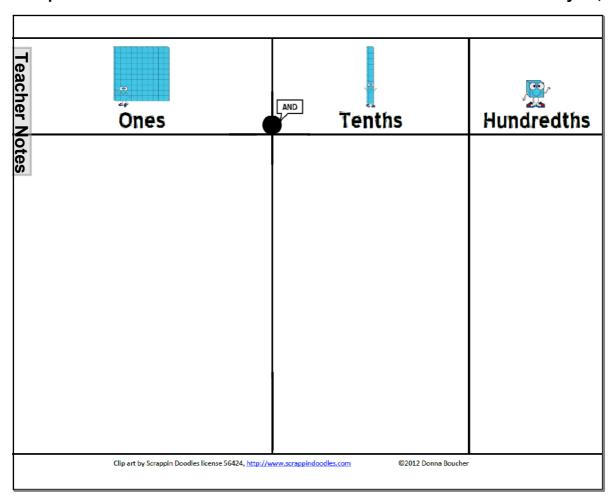
How many ninths are in 1 whole?

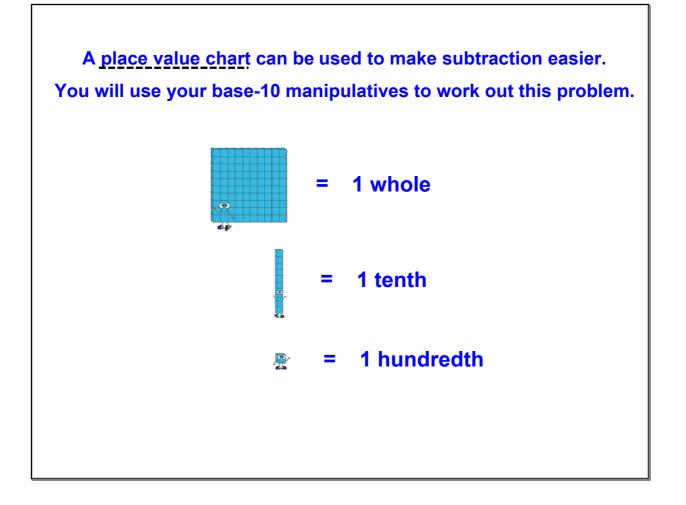
The underline is linked to the page in the presentation's glossary containing the vocab chart.

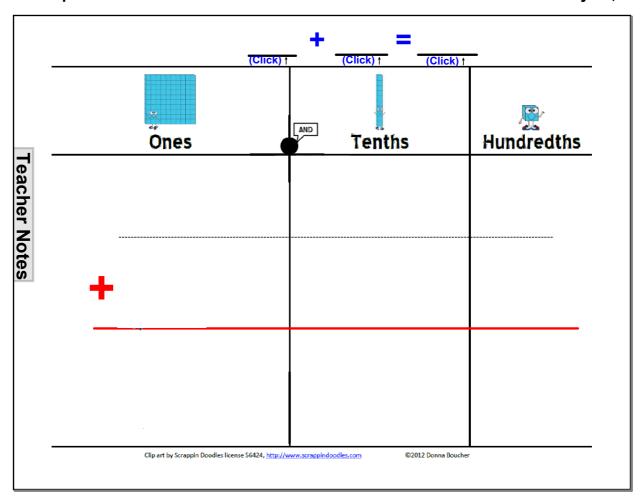


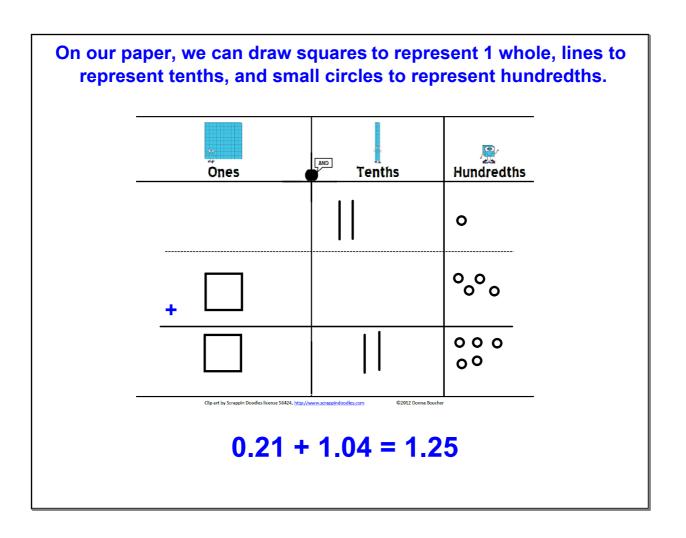
Decimal Addition

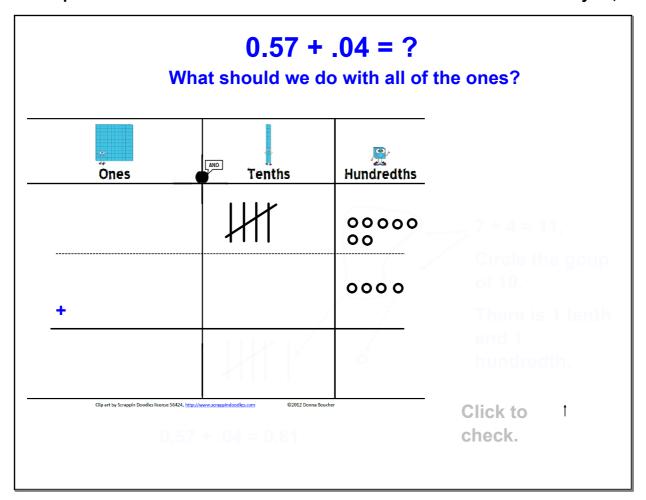
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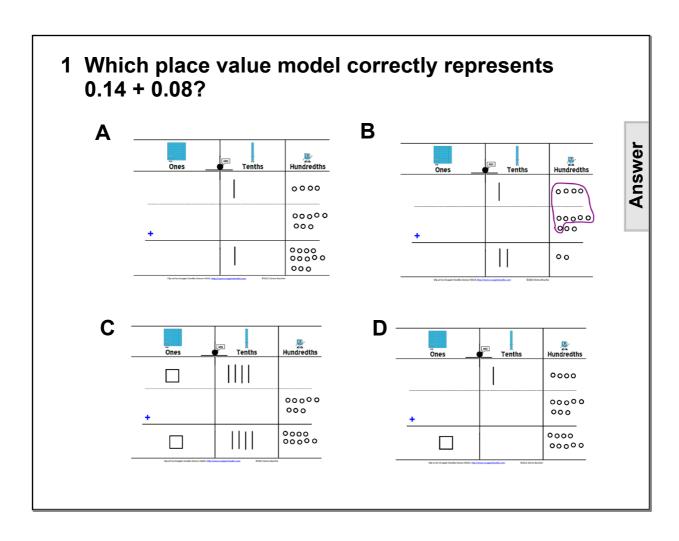








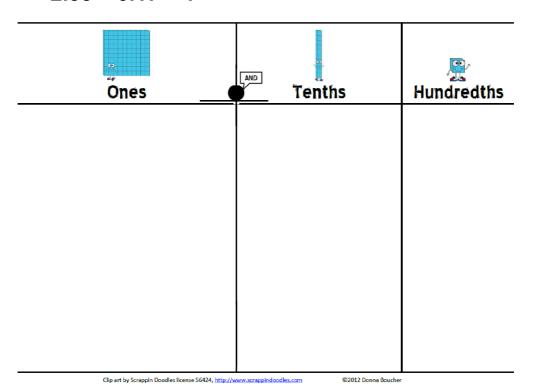




Answer

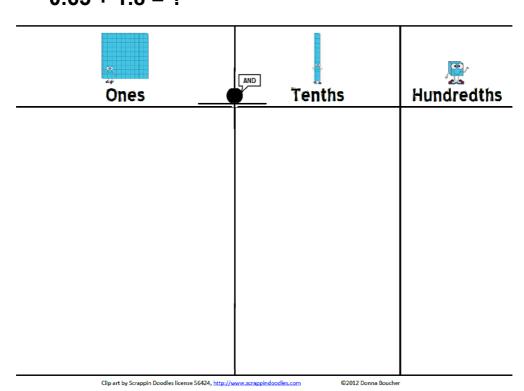
2 Use the place value chart to model the following problem. What is the answer?

2.35 + 0.17 = ?



3 Use the place value chart to model the following problem. What is the answer?

0.65 + 1.8 = ?



4 Solve, then write your answer in <u>standard form</u>. Draw and use a place value chart to help you.

1 tenth + 1 and 2 tenths = _____

Now V

5 Solve, then write your answer in standard form. Draw and use a place value chart to help you.
35 thousandths + 8 thousandths = _____

6 Solve, then write your answer in standard form. Draw and use a place value chart to help you.
6 thousandths + 9 ones 5 thousandths = _____

Add decimals

0.25

0.25

0.25

0.25







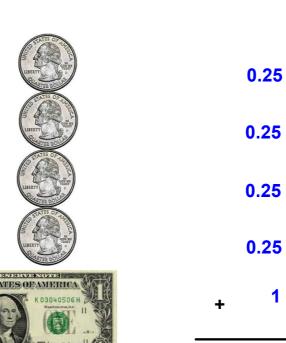


Four quarters equal one dollar



= \$1.00





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

1

\$0.26

0.25 0.25 0.25 0.25 + 1.00

Can you explain why? It may help if you use the words "place value". 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 left.
- Step 3: Place the decimal point in the answer directly below the decimal points that you lined up in Step 1.

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

$$0.2 + 1.35 + 0.09 + 2.41$$

0.20 ← Why was a zero written here?
 1.35
 0.09
 + 2.41

7	' Find the sum	:		
	0.3 + 0.47			
				Answer

_		_	
Ω	Find	tho	sum:
O	FIIIU	uie	Sulli.

=-----

1.5 + 0.3

_					
a	Ein	ᅬ	tha	sun	•
J	ГШ	u	uie	Sull	Ι.

$$0.7 + 0.06 + 1.5$$

10

From PARCC sample test

Enter your answer in the box.

$$5.63 + 14.37 =$$

11 Find the sum:

$$0.064 + 1.27 + 29.8$$

Answe

12 Find the sum:

-

$$10.7 + 107 + 1.07 + 0.107$$

Let's go to Cool Math and practice more addition:

Cool Math Link



Alice went bike riding at a park outside Newark. She biked 4.79 miles in the morning and 5.12 miles after lunch. How many miles did Alice bike in all?

Answei

Jeremy bought a jacket for \$37.99 and a pair of jeans for \$39.50. How much did Jeremy spend in all?

Answer

On Friday, it rained 1.19 inches, a nd on Saturday, it rained 1.73 inches. How much did it rain on Friday and Saturday combined?

Steven has \$252.35 in his savings account. He makes deposits of \$24.65 and \$49.50. What is the new balance in his savings account?

Answer

Mr. Smith bought 3.5 pounds of ground beef and 2.485 pounds of sliced turkey.

How many pounds of meat did he buy in all?

The average temperature in May in Plainsville is 64.9 degrees F. This year the average temperature in May was 7.5 degrees higher than normal. What was the average temperature in Plainsville this May?

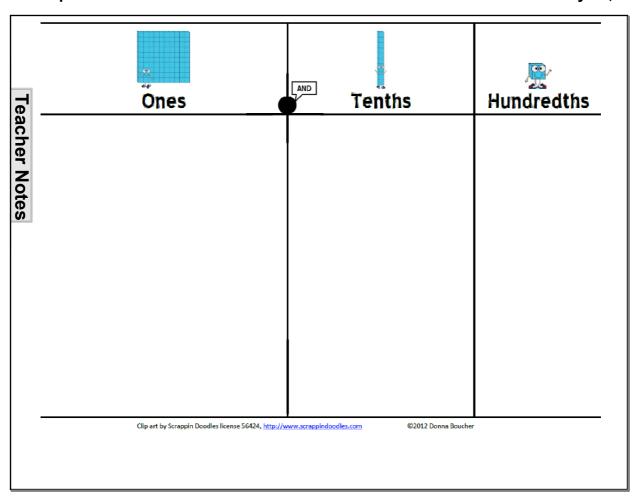
19 Corey bought 86.2 grams of walnuts and 52.89 grams of chopped almonds. How many grams of nuts did he buy all together?

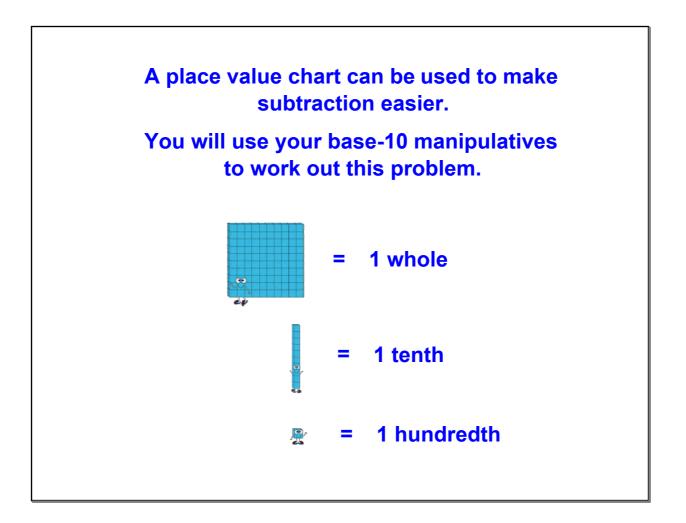
A relay race consists of four sections.

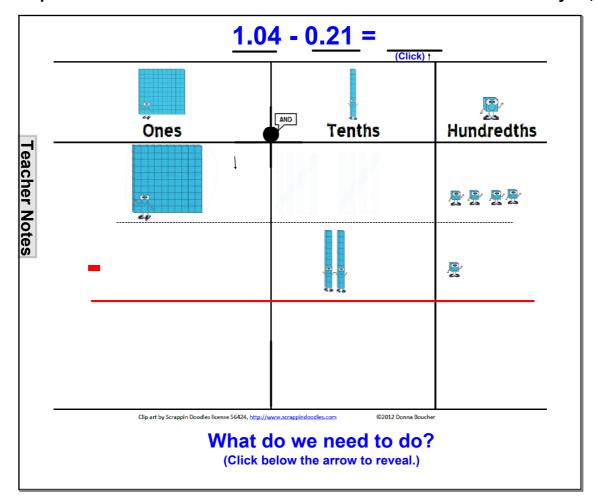
Teams A completes the first section in 112.5 seconds, the second section in 124.43 seconds, the third section in 97.82 seconds, and the last section in 103 seconds. How much time did it take Team A to run the entire relay race?

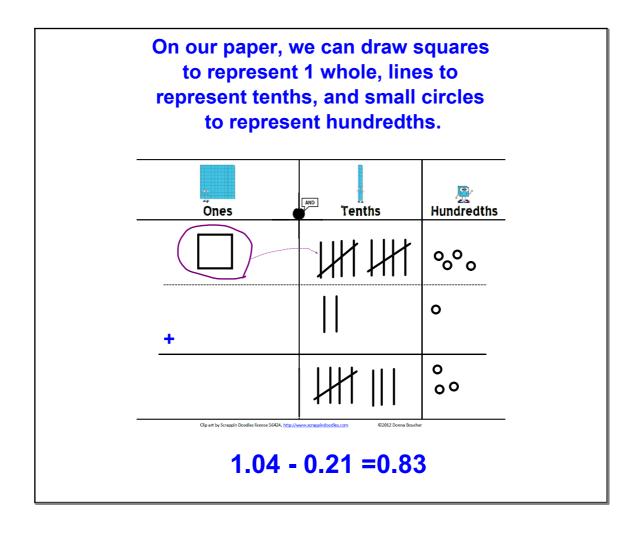
Decimal Subtraction

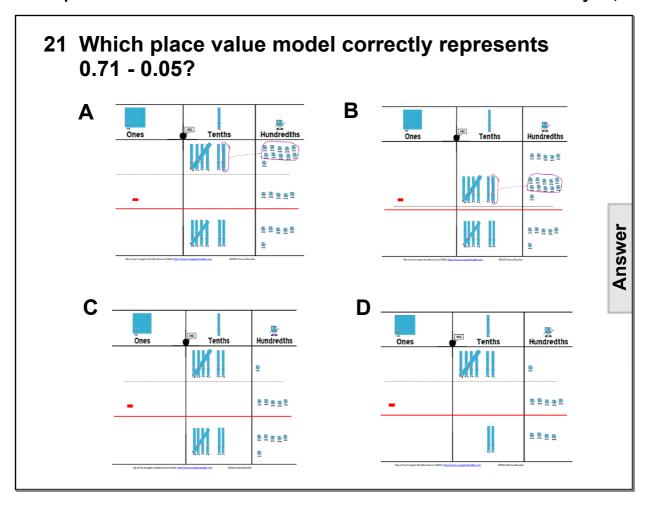
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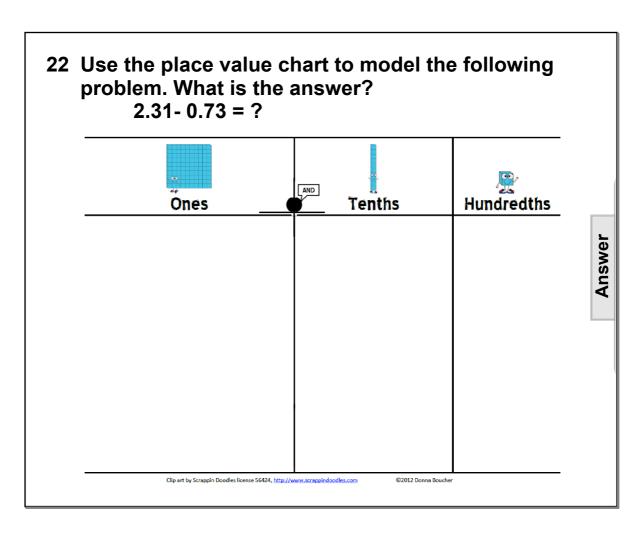






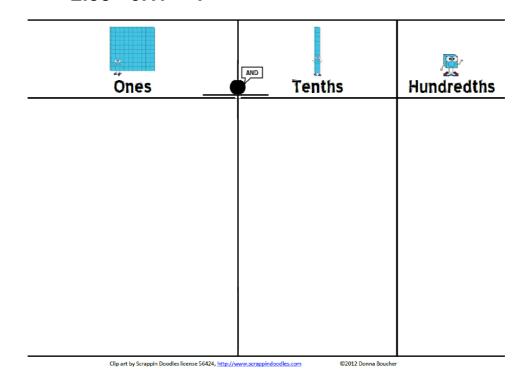






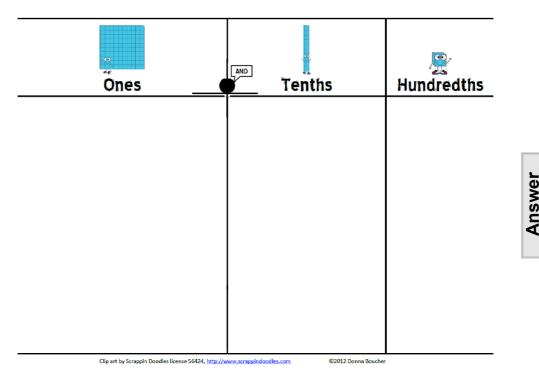


$$2.35 - 0.17 = ?$$



24 Use the place value chart to model the following problem. What is the answer?

$$1.8 - 0.65 = ?$$



Subtract decimals

Put the numbers in a vertical column aligning the decimal points.

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

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

Don't forget...Line 'em Up!

Remember, when subtracting, the largest number always goes on top.

One last thing to remember when subtracting numbers with decimals, is that the place value of the digits to the right of the decimal cannot be changed.

Zeros cannot be deleted, unless they are the last digit(s).

Example: .4080

<u>- .3860</u> .0220

You cannot delete the zero in the tenths place, or you will change the place value of the following two digits.

 $.0220 \neq .220$

However, you can delete the zeros at the end of the number.

.0220 = .022

25 Find the difference

3.6 - 2.1

26 Find the difference

8.05 - 6.23

27 Find the difference

=------

3.84 - 0.29

28 Find the difference

36.784 - 32

29 Find the difference

6.8 - 4.23

30 Find the difference 2 - 0.59

Let's go to Cool Math and practice subtraction:

Cool Math Link

click here



Frank's water bottle can hold 22.2 oz of water. Tim's bottle can hold 13.5 oz.

How much more water can Frank's bottle hold?

Answer

Josh threw a ball 15.53 meters. Trish threw a ball 16.49 meters. What is the difference between the two distances?

Dennis ran 7.5 miles in the amount same time that Rita ran 5.73 miles. How many more miles did Dennis run than Rita?

Anewoo

McKenzie bought 14.32 gallons of gasoline. She used 9.63 gallons of gasoline on a trip to Jersey City. How much gasoline does McKenzie have left in her car?

Donald weighted 192.4 pounds last year. He weighs 176.8 pounds this year. How much more did Donald weigh last year than this year?

Maria ran the 200 meter dash in 29.152 seconds. Shelby ran the 200 meter dash in 28.901 seconds. How much longer did it take Maria to run the 200 meter dash than Shelby?

The original price of a plasma TV was \$3,695.99. Barry bought the TV on sale for \$2,499.50. How much did Barry save?

V DO V

On Monday, it rained 1.25 inches. On Wednesday, it rained 1.92 inches. How much more rain fell Wednesday than Monday?

D C WO

Multiplication of Multi-Digit Numbers

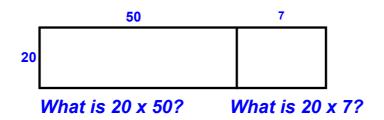
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Remember from 4th Grade:

We are now ready to move onto multiplying larger numbers.

Let's use the area model to find the product of 20 x 57.

Because one of the <u>factors</u> is a multiple of 10, which is an easy number to multiply, we only need to break up "57".



The $\underline{\text{sum}}$ of your products is equal to 20 x 57.

So, the product of $20 \times 57 = ?$

Remember from 4th Grade:

Most problems will not have factors that are so easy to multiply! You will have to break upboth factors!

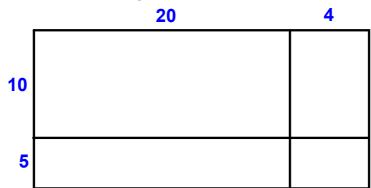
Let's use the area model to multiply 15 x 24. We'll need to break up both the "15" and the "24". How do you think these factors should be broken up to make solving this problem as easy as possible?

Answer

Answer

Remember from 4th Grade:

The model we'll make for this problem will look a little different. We'll need two sections on each side since both factors were broken up.



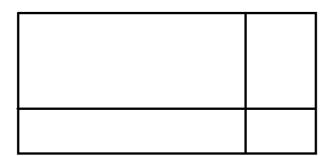
Multiply the factors in each of the four sections and then find the sum. This will be the product of 15×24 .

Remember from 4th Grade:

Let's try another example...

26 x 13

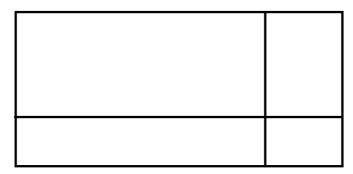
How will you set up this problem? Think about it carefully and use the model below to find the product.



Answer

39 Use the area model to find the product.

29 x 19



Use the area model to find the product of 74 x 56. Write your answer in standard form.

Answer

41 The classroom has 27 boxes of crayons with 24 crayons in each box. What is the total amount of crayons in the classroom? Use an area model to solve the problem, and write your answer in standard form.

Teacher Notes

One way to find the product of two numbers is to use an area model.

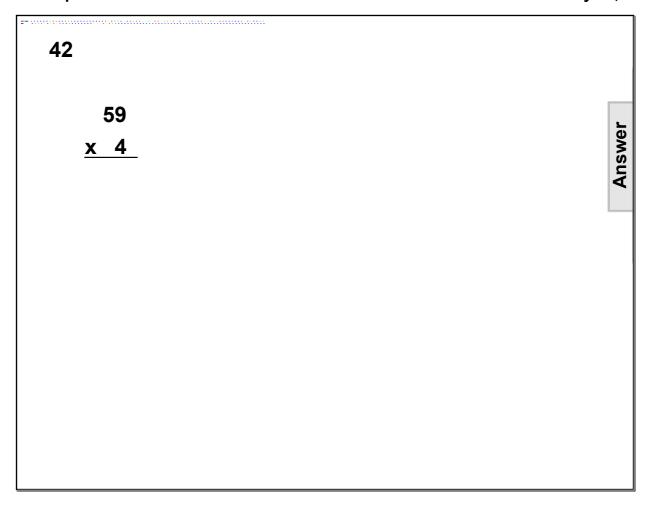
Another way is to use the algorithm.

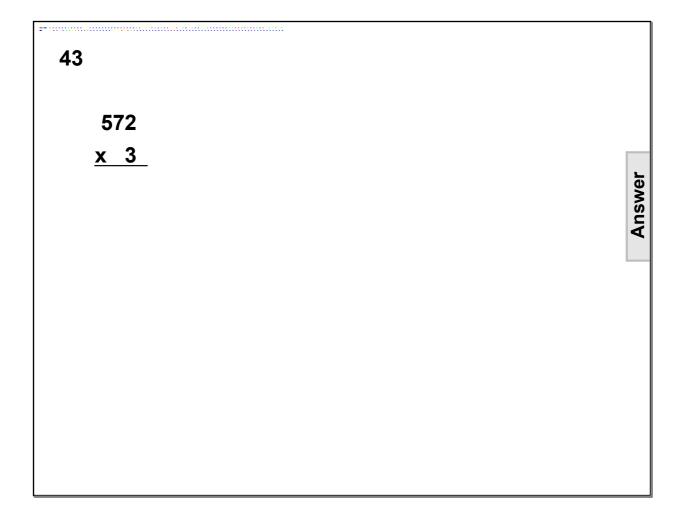
Lets review the multiplication algorithm for multiplying whole numbers.

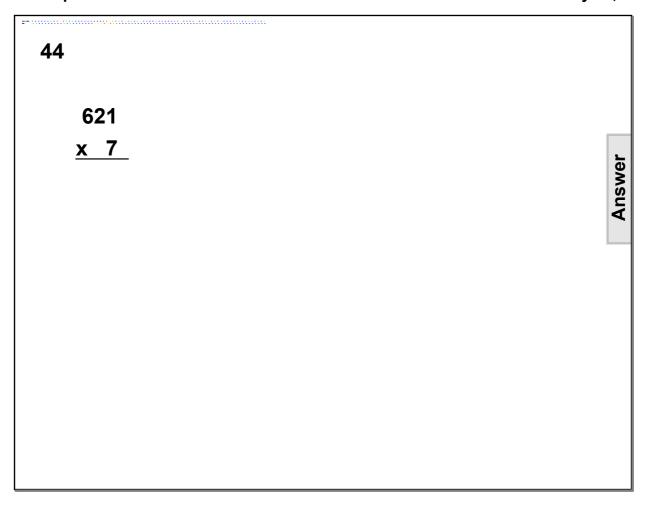
Steps: Multiply the ones: Multiply the tens: Multiply the hundreds:

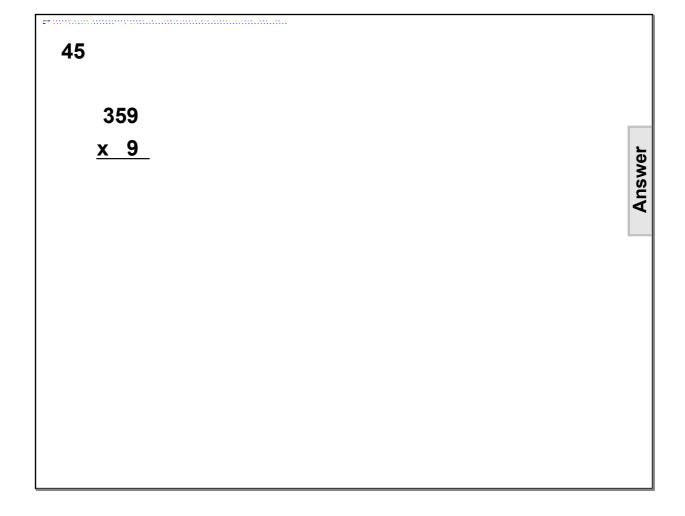
Steps:	405 x 7	
Multiply the ones:		
Multiply the tens:		
Multiply the hundreds:		
Steps:	405	

Steps:	405 <u>x 7</u>	
Multiply the ones:		
Multiply the tens:		
Multiply the hundreds:		

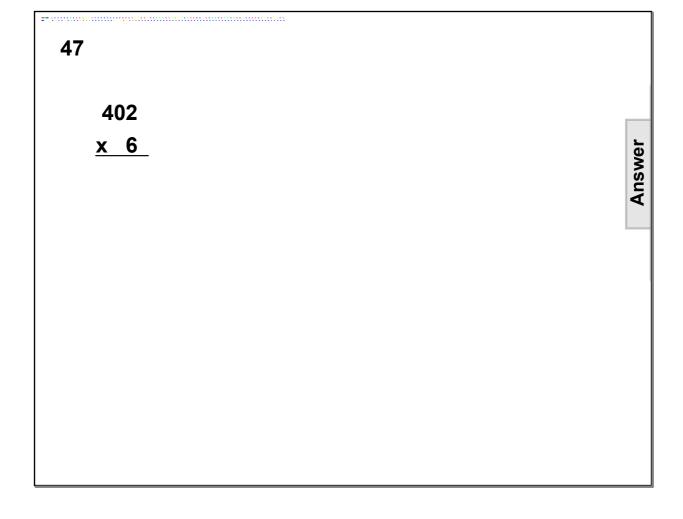








46		From PARCC sample test	
	Enter your answer in the box.		
	$463 imes 1,945 = line{}$		
			Answer



Steps: 2

1

562

<u>x 42</u>

Multiply 562 x 2: 1124

Multiply 562 x 40: + 22480

Add two products: 23604

Steps: 14

12

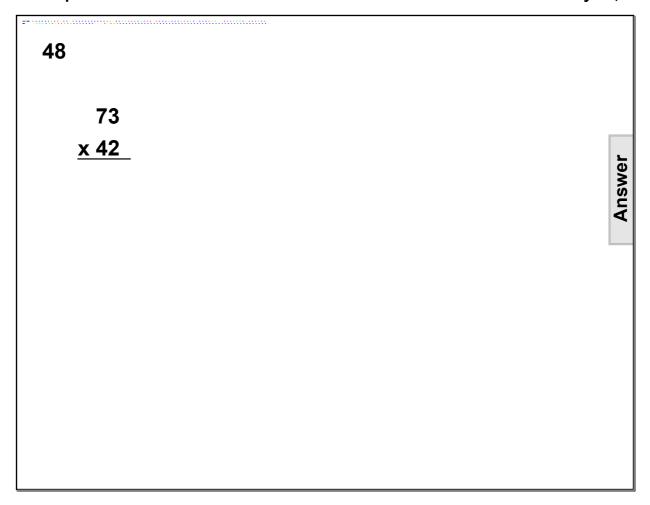
738

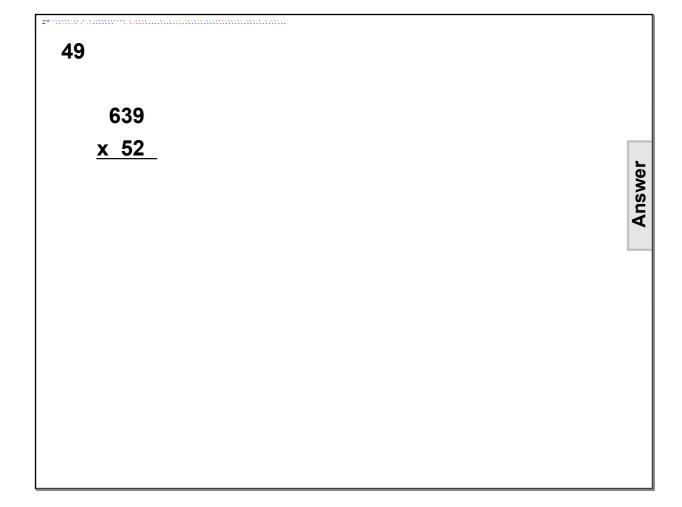
<u>x 53</u>

Multiply 738 x 3: 2214

Multiply 738 x 50: + 3<u>6900</u>

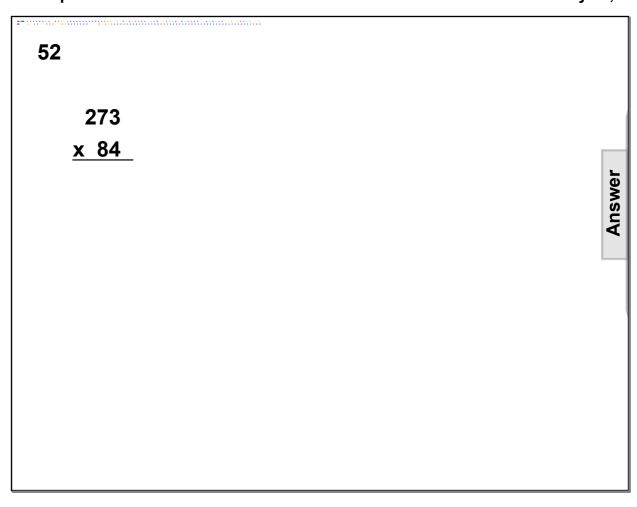
Add the two products: 39114





50		From PARCC sample test
	Enter your answer in the box.	
	625 imes847=	
		Answer

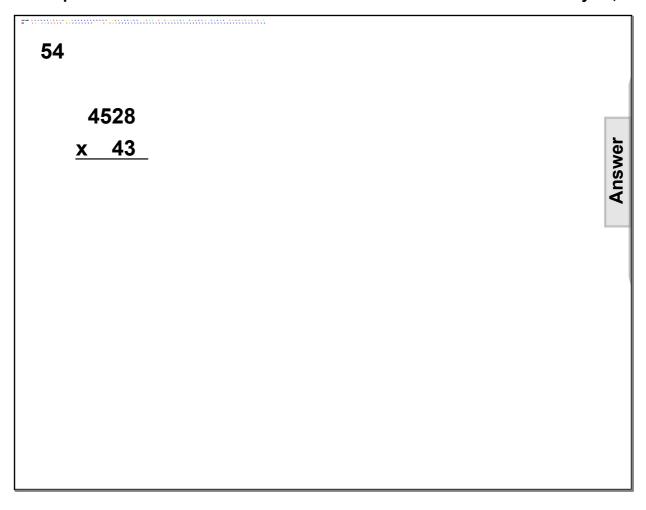
51		
704 <u>x 19</u>		
		ver
		Answer



From PARCC sample test

Enter your answer in the box.

$$371 \times 2,\!584 = \boxed{}$$

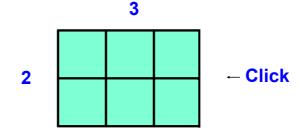


Decimal Multiplication

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Using an Area Model

How can we turn this model showing 2 x 3 into a model showing 2 x 3.5?



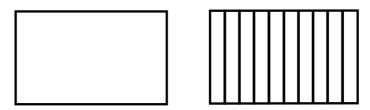
How many square tiles is it now?

What number sentence represents the number of square tiles?

What if we add another row?

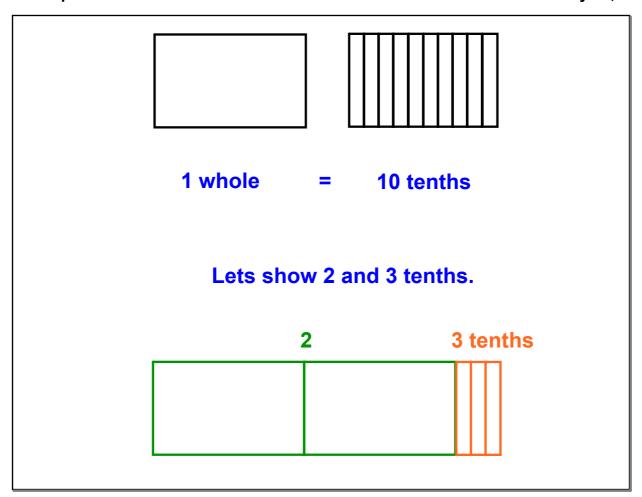
What number sentence will represent the number of square tiles?

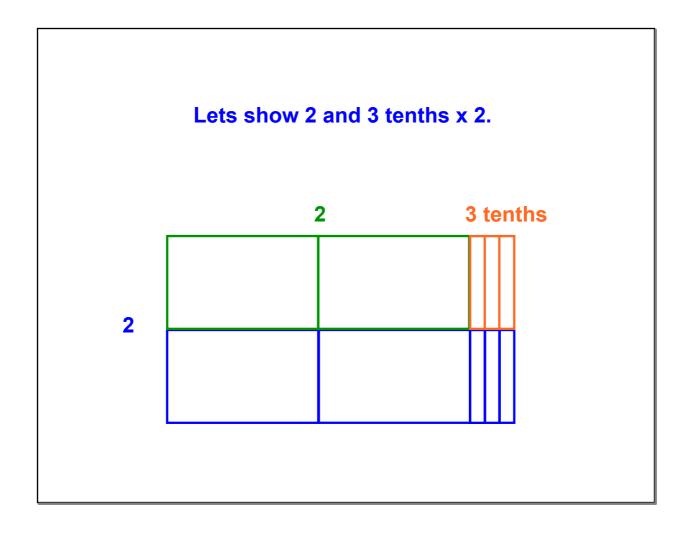
Lets look at a way to show tenths.

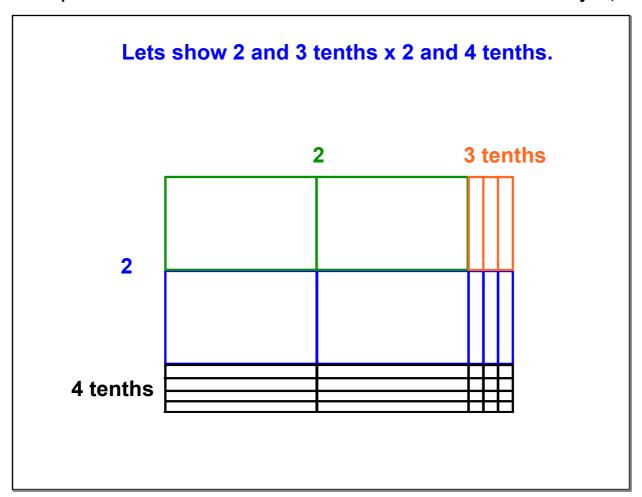


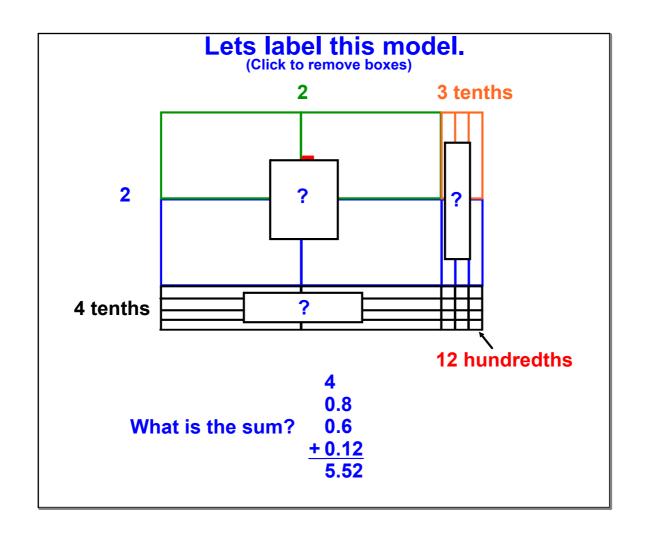
1 whole = 10 tenths

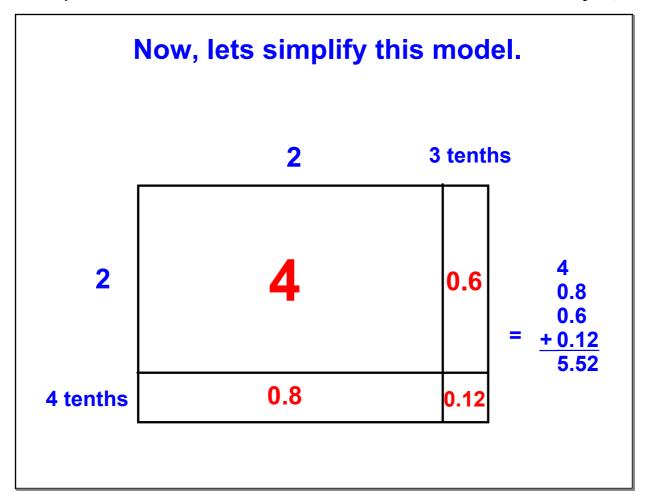
This whole has been split into ten equal pieces.











Lets create another one.

4 x 20.3

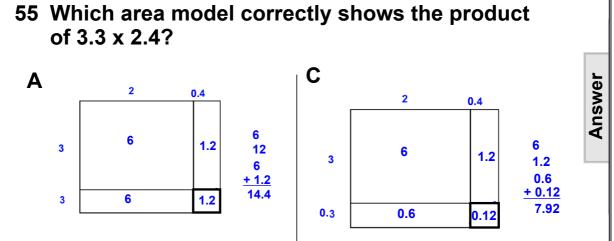
Lets build another model.

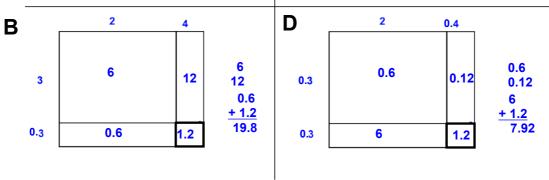
Represent 6 x 37.3.

Answer

Lets create another one.

4.4 x 2.3





56 Use an area model to find the product of 1.2 x 3. Write your answer in standard form.

57 Use an area model to find the product of 1.2 x 3.8. Write your answer in standard form.

Aneway

58 Use an area model to find the product of 7.4 x 42.6. Write your answer in standard form.

Multiply Decimals

To multiply two decimals:

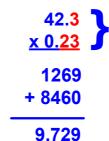
- 1. Ignore the decimal points.
- 2. Multiply the numbers.
- 3. Count the total number of digits to the right of the decimal points in both numbers, and add them together.
- 4. Beginning at the end of the product, count to the left the total places from part 3, and place your decimal there.

Multiply Decimals

4.31 x .03

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.



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.

.01 x .4 There are a total of three digits to the right of the decimal points.

04

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

But the answer you get is only 2 digits.

Click for next step.

59 Which answer has the decimal point in the correct location?

A 384

12.8

в 38.4

x ___3

- C 3.84
- D 0.384

60 Which answer has the decimal point in the correct location?

A 27606

64.2

B 2.7606

x <u>0.43</u>

- C 27.606
- D 276.06

61 Which answer has the decimal point in the correct location?

A 0.64232

0.518

В 6.4232

x <u>12.4</u>

C 64.232

D 642.32

62 Which answer has the decimal point in the correct location?

A 208828

6.142

В 20882.8

x 34

- C 2088.28
- D 208.828

Ang

63 Solve

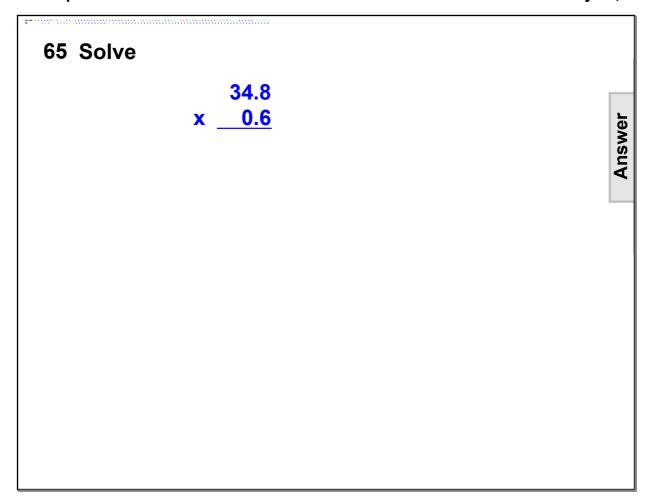
Answer

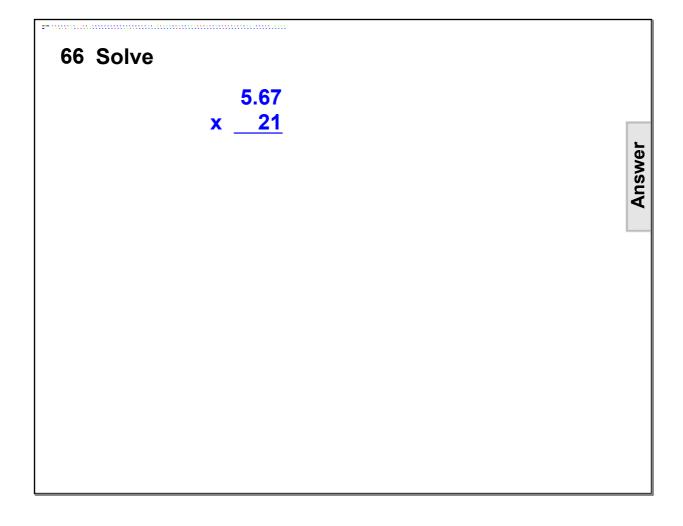
64

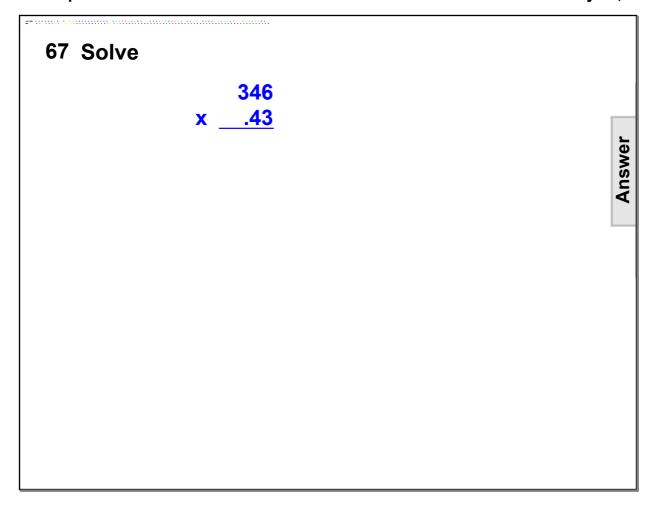
From PARCC sample test

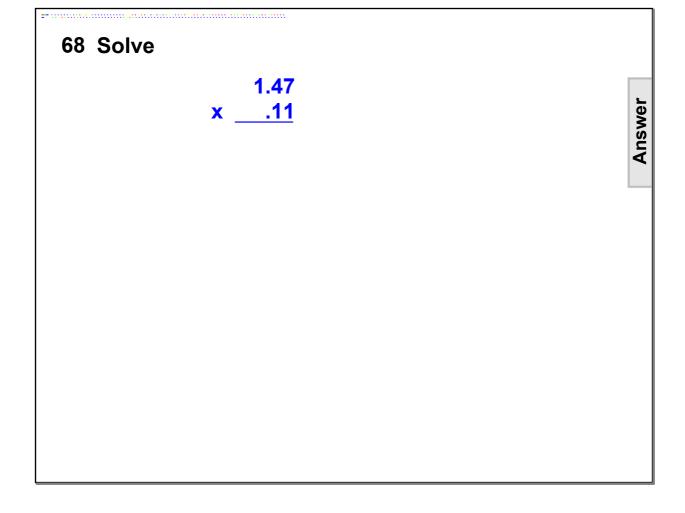
Enter your answer in the box.

$$0.35 imes 1.5 =$$









69 Liam needs four boards to make a square frame. Each needs to be 14.75 inches long. What is the total length of boards he needs?

Mrs. Fredricks want to buy matching sweaters for her seven grandchildren.

The sweaters are \$19.65 each. How much will she spend to buy all seven?

Now V

71	From PARCC sample test
	A company sells phones for \$515.00 each.
	What is the total amount of money the company earns from selling 856 phones?
	Enter your answer in the box.
	Answer

72		From PARCC sample test
	The parts to build these phones cost \$189.00 for each phone.	
	What is the total cost of parts to build 856 phones?	
	Enter your answer in the box.	
	\$	
		-

73 The path around the park is 315.36 yards long. Rachel wants to run 2.5 times around the path. How many yards will she run?

Answer

Mixed Word Problems

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74 If you had five hundredths of a mile left to run, how would you write this distance as a decimal?

A 5.0

B .5

C .05

D 05.0

E .50



75 Sally ran twelve and fifty-six thousandths miles on one week. She wants to record it in her running log. How will she write that in standard form?

A 12.56 miles

B 12.056 miles

C 12.0056 miles

D 12,56

E 12.560



76	You have \$11.00. Do you have enough money to
	buy 4 highlighters for \$1.85 each and one fancy
	pen for \$2.65?

Yes

No



Answer

77 You have \$11.00. How much will it cost to buy 4 highlighters for \$1.85 each and one fancy pen for \$2.65?



78 Your weekly grocery bill averages \$87.39. Round your total to the nearest 10 dollars to figure out approximately how much money to save for groceries per week.

A \$100.00

B \$90.00

C \$87.00

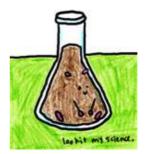
D \$80.00



79 Your weekly grocery bill averages \$87.39. Round your total to the nearest 10 dollars to figure out approximately how much money you need to save for groceries per month.



- 80 Jack won \$35.00 for his science fair project. His project cost \$13.85 to prepare. How much did Jack actually make as a profit?
 - A \$22.85
 - B \$22.15
 - C \$21.15
 - D \$21.85



- 81 Five students collected paper to be recycled. Shelly's stack was 3.2 cm. thick; Ken's stack was 1.08 cm. thick; Joe's stack was 4 cm. thick; Betty's stack was .75 cm. thick; Mary's stack was 2.4 cm. thick. What was the total thickness of the papers collected to be recycled?
 - A 243 cm.
 - B 24.3 cm.
 - C 11.43 cm.
 - D 1143 cm.



Anewo

82 The regular price of a pair of jeans is \$25.99. Mrs. Jones has four children for whom she must buy new jeans. The jeans are on sale for \$19.95.

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

A \$79.80

B \$103.96

C \$7,980

D \$10,396



83 The regular price of a pair of jeans is \$25.99. Mrs. Jones has four children for whom she must buy new jeans. The jeans are on sale for \$19.95.

How much money does she save buying the jeans on sale?



84 Ricky had \$75.25 in his savings account. After he withdrew some money he had \$45.31 left. How much money did he withdraw?

Answe



85 Victoria bought a taco for \$3.25 and a drink for \$1.29. If she paid with a \$20 bill, how much change did she get back?

Mary has \$375.12 in her savings account. She deposits \$14.52 and later withdraws \$68.10. What is her new balance?



Answer

Paul has \$255.50 in his savings account.

Last month he withdrew \$34.99 to buy a video game. Yesterday he deposited \$50 in his account as a birthday gift. What is his new balance to his savings account?



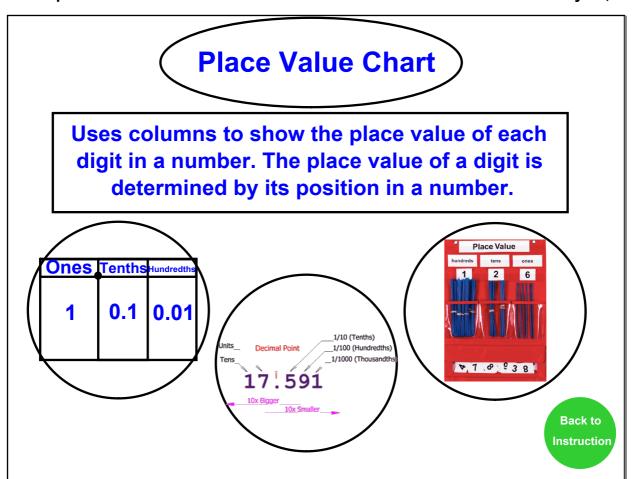
Thomas had a \$20 bill when he went to the movies. He bought a ticket for \$8.50, popcorn for \$3.75 and a drink for \$2.50. How much money did he have left after the movies?

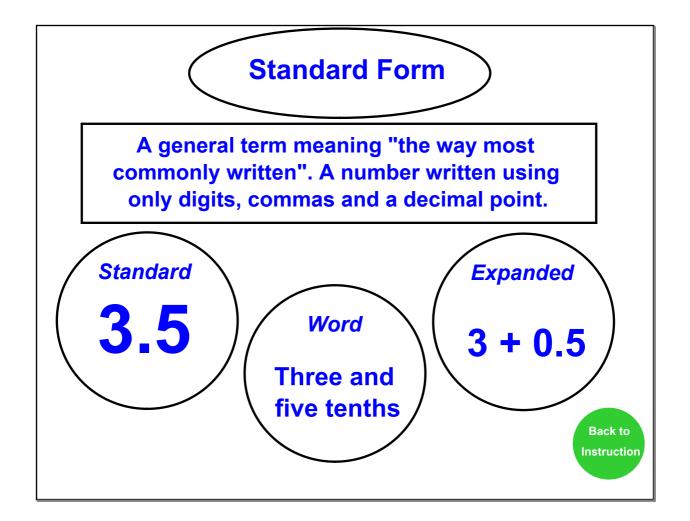
89 Don took aluminum cans to his local recycling center. He received \$2.16 for 6 pounds, \$2.52 for 7 pounds and \$2.88 for 8 pounds of aluminum cans. How much money will he receive for 10 pounds of aluminum cans?

90 Rosa buys a sweater for \$21.99, gloves for \$9.95 and a hat for \$4.89. After making these purchases, she buys some heavy socks. In all, she spent \$41. What is the amount she paid for the socks?

Glossary

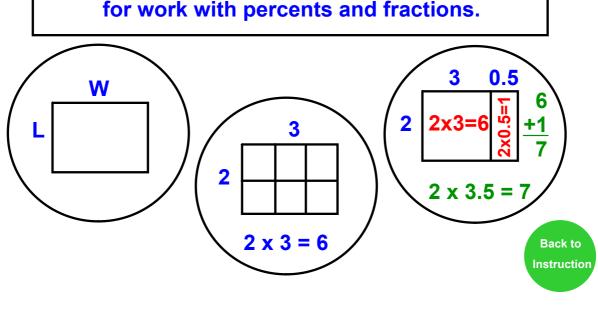
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Area Model

A diagram which uses the length and width of rectangles to show products. It can also be used for work with percents and fractions.





A whole number that can divide into another number with no remainder.

A whole number that multiplies with another number to make a third number.

