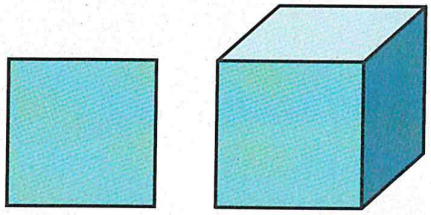
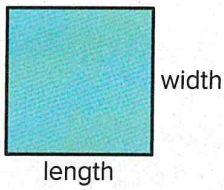
Learn

How are these figures the same?
How are they different?

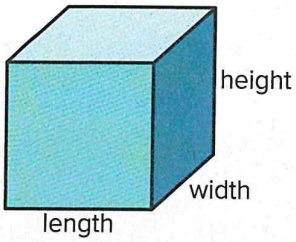


This figure has two dimensions.



Each dimension is a measureable edge length.

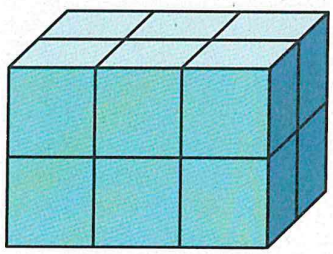
This figure has three dimensions.



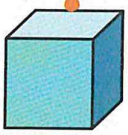
Each dimension is a measureable edge length.

The space occupied by a 3-dimensional figure is called **volume**.

You can pack **rectangular prisms** using **unit cubes** with no gaps or overlaps to establish volume.



A unit cube has edge lengths of 1 unit.

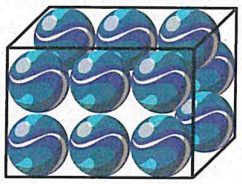


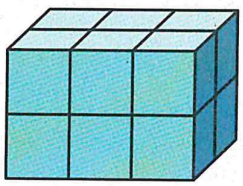
Math is... Precision

Does an empty box have volume? Does a filled box have volume? Explain why or why not.

Work Together

One student used marbles to pack a rectangular prism. Another student used unit cubes.





What do you notice about these strategies?

Marbles volume cannot be found as they are not closely packed. But cubes volume can be found as they are closely packed

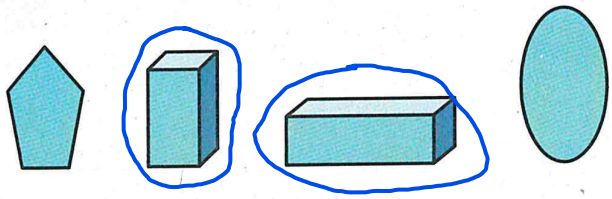
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On My Own

MATH REPLAY | GO ONLINE

Name _____

1. Which of these figures have volume? Justify your reasoning.



For the situation, would you measure the *length*, *area*, or *volume*? Explain.

2. the amount of soil needed to fill a flower pot

Volume
Flower pot has space

3. the distance of a bike ride

Length
Bike covers distance

4. the amount of wall space covered by a poster

Area
Poster is plane

5. the amount of concrete needed to fill a patio

Volume
Patio has space

6. the space inside a moving truck

Volume
Space inside Truck

7. the distance around a building

Length
Distance is length

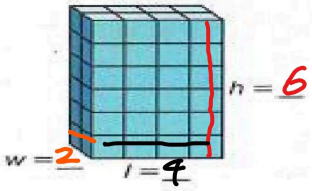
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Part-2 – MCQs

6	Lesson name	Example/Exercise	Page
	Use formulas to determine volume	1-7	43

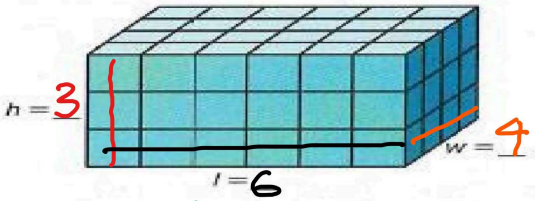
Label the dimensions and then determine the volume of the figure.

1.



$V = 2 \times 4 \times 6$ cubic units
$= 48$ cubic units

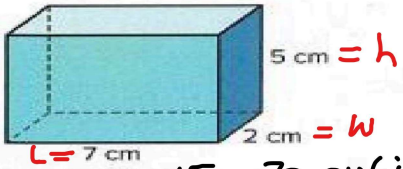
2.



$V = 3 \times 6 \times 4$ cubic units $= 72$ cubic units

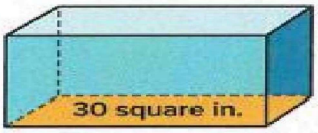
What is the volume of the figure? Tell which volume formula you used and why.

3.



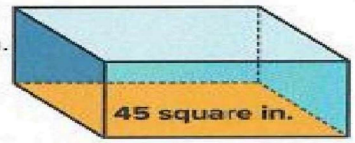
Volume = $7 \times 2 \times 5 = 70$ cubic cm
Volume = $L \times w \times h$

4.



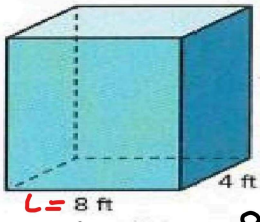
Volume = Base x height
$= 30 \times 4 = 120$

5.



Volume = Base x height
$= 45 \times 4$
$= 180$ cubic inches

6.



Volume = $L \times w \times h$
Volume = $8 \times 4 \times 10 = 320$

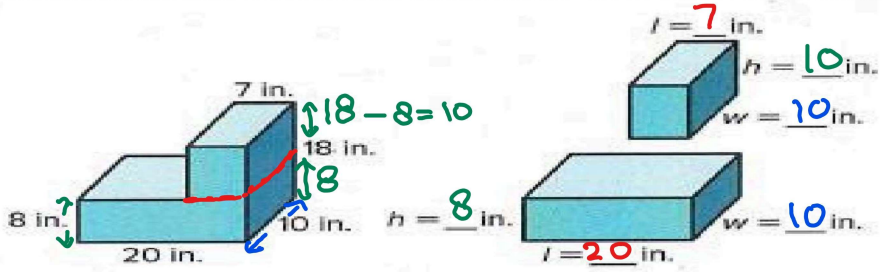
7. Explain how the Associative Property can be used to mentally find the volume of this figure. Multiply in any way the answer is same



Volume = $L \times w \times h = 10 \times 9 \times 4 = 10 \times 4 \times 9 = 4 \times 10 \times 9 = 360$ cubic cm

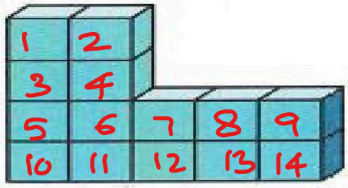
7	Lesson name	Example/Exercise	Page
	Determine the volume of composite figures	1-5	49

1. Label the unknown dimensions of the decomposed figure and then find the volume of the composite solid figure.



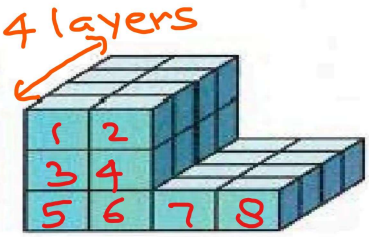
What is the volume of the figure?

2.



$V =$ 14 cubic units

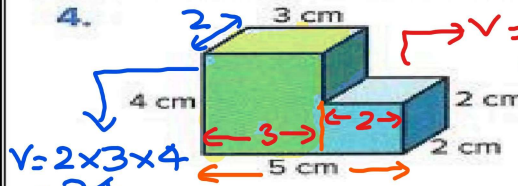
3.



$V =$ 4 × 8 = 32 cubic units

Draw line(s) to show how you decomposed the figure.
What is the volume of the figure?

4.

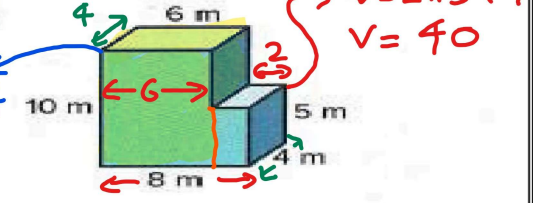


V = 2 × 2 × 2 = 8

V = 2 × 3 × 4 = 24

$V =$ 24 + 8 = 32

5.



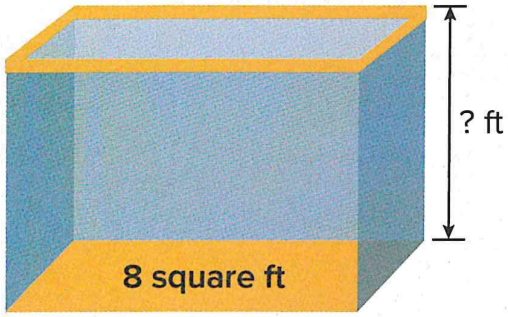
V = 10 × 6 × 4
V = 240

V = 2 × 5 × 4
V = 40

$V =$ 240 + 40 = 280

Learn

A fish tank has a volume of 24 cubic feet.
How can you determine the height of the fish tank?



Math is... Quantities

How can you describe the relationship between the given quantities?

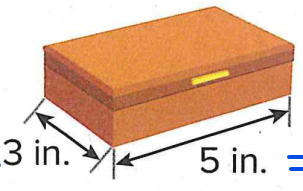
You can use a volume formula to solve problems.

The volume of the tank is 24 cubic feet. The base is 8 square feet. $V = B \times h$ $24 = 8 \times h$	To solve the equation, write a related division equation. $24 = 8 \times h$ $24 \div 8 = h$ $24 \div 8 = 3$ The fish tank has a height of 3 feet.

When solving problems involving volume, you can use the given information to help you determine which volume formula to use.

Work Together

A jewelry box has a volume of 30 cubic inches.
What is the height of the jewelry box?
Show your work.



Volume = L x W x H W = 3 in. 5 in. = L

$H = \frac{\text{Volume}}{W \times L}$

$H = \frac{30}{3 \times 5} = \frac{30}{15} = 2$

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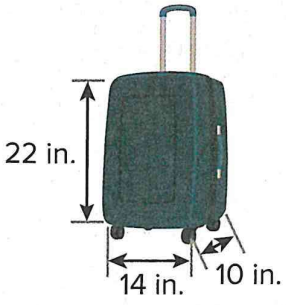
On My Own

MATH REPLAY | GO ONLINE

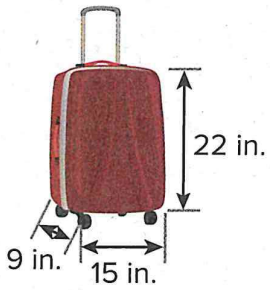
Name _____

1. Lillian wants to buy the suitcase with the greater volume. Which suitcase should she buy? Explain.

Suitcase A

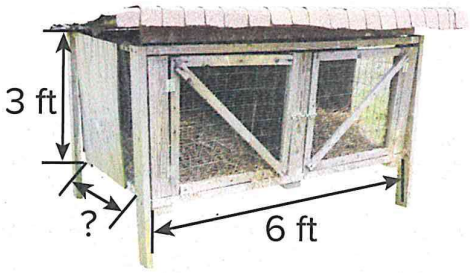


Suitcase B



2. A cargo container has a volume of 108 cubic meters, a height of 3 meters, and a width of 2 meters. How long is the cargo container? Show your work.

3. The volume of this rabbit hutch is 36 cubic feet.
What is the width? Show your work.



4. The base of a rectangular prism is a square with side lengths equal to 5 centimeters. The volume of the rectangular prism is 100 cubic centimeters. What is the prism's height? Explain.

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PAGE - 53
QUESTIONS 1 - 4

1 Volume of Suitcase A = l x w x h

= 14 x 10 x 22

= 140 x 22

= 3080 cubic inches

Volume of Suitcase B = l x w x h

= 15 x 9 x 22

= 135 x 22

= 2970 cubic inches

3080 > 2970

Volume of suitcase A > Volume of Suitcase B

Lillian must buy suitcase A

2 V = 108 cubic meters

h = 3 meter, w = 2 meter

length of container = V ÷ (h x w)

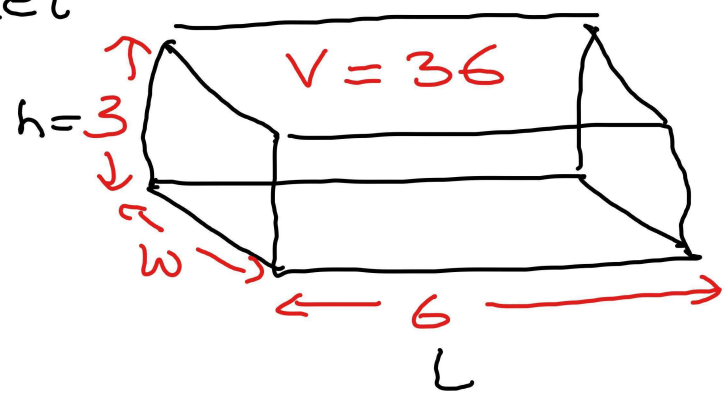
= 108 ÷ (3 x 2)

= 108 ÷ 6

= 18

length of container = 18 meter

3 V = 36 cubic feet



$w = V \div (h \times L)$

$w = 36 \div (3 \times 6)$

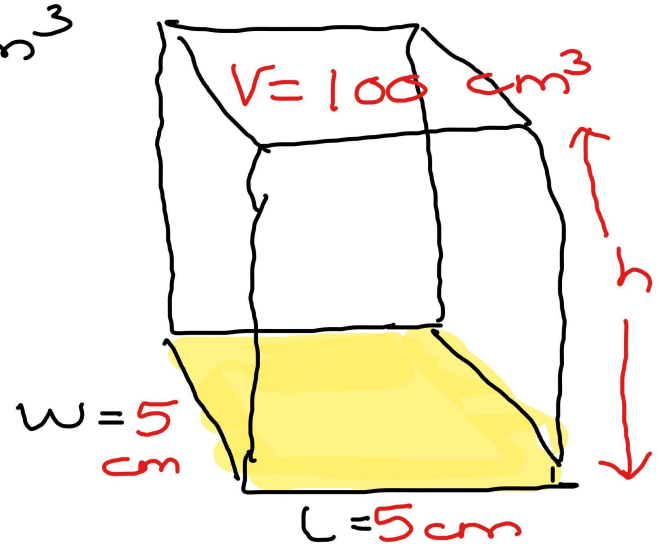
$w = 36 \div 18$

$w = 2$ feet

width of rabbit hutch = 2 feet

4 Volume $= 100\ cm^3$

V



$h = V \div (w \times L)$

$h = 100 \div (5 \times 5)$

$h = 100 \div 25$

$h = 4$ cm

Prism height is 4 cm

MATH REPLAY | GO ONLINE

Volume = L x W x H

24 x 1 x 2 = 48

11. The volume of a rectangular prism is 48 cubic inches. Which could be the dimensions of the prism? Select all that apply. (Lesson 2–3)

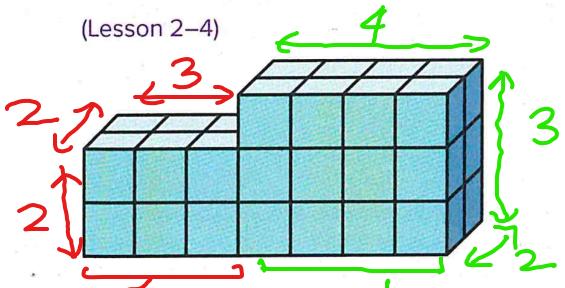
A. length = 24 inches — L
width = 1 inch — W
height = 2 inches — H

B. length = 6 inches
width = 6 inches
height = 4 inches

C. length = 16 inches
width = 16 inches
height = 16 inches

D. length = 12 inches
width = 2 inches
height = 2 inches

12. What is the volume of this figure? (Lesson 2–4)



A. 32 cubic units

B. 38 cubic units

C. 34 cubic units

D. 36 cubic units

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Volume = 2 x 2 x 3 = 12

Volume = 4 x 3 x 2 = 24

Total volume = 24 + 12 = 36

8	Lesson name	Example/Exercise	Page
	Extend place value to decimals	1-8	69

1. Which of the following statements is *true*?
   - A. 0.009 is ten times 0.09
   - B. 0.09 is ten times 0.009
   - C. 0.09 is $\frac{1}{10}$ of 0.009
   - D. 9 is $\frac{1}{10}$ of 0.9

2. Which of the following statements is *true*?
   - A. 0.003 is $\frac{1}{10}$ of 0.03
   - B. 0.03 is $\frac{1}{10}$ of 0.003
   - C. 0.3 is ten times 0.003
   - D. 3 is ten times 0.03

Marcella has $5.00, Niko has $0.50, and Benjamin has $0.05. Use this information to complete each sentence.

3. Benjamin has $\frac{1}{10}$ the money Niko has.
4. Marcella has 10 times the money Niko has.

Complete each sentence.

5. $9.00 is 10 times $0.90.
6. $0.90 is $\frac{1}{10}$ times $9.00.
7. 0.04 is 10 times 0.004
   0.004 is $\frac{1}{10}$ times 0.04
8. 2 is 10 times 0.2
   0.2 is $\frac{1}{10}$ times 2

9. Error Analysis Toby writes the number 23.2 and says that the value of the digit 2 in the tens place is 10 times the value of the digit 2 in the tenths place. How do you respond to him?

10. For which numbers is the value of the digit 8 ten times the value of the digit 8 in the number 4.984?

A. 3.814 **B.** 5.820

C. 6.982 **D.** 8.492

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PAGE - 70

QUESTIONS 9-10

9

$$2 \quad 3 . \quad 2$$

↓ TENS ↓ ONES ↓ TENTH

$23.2 = 20 + 3 + 0.2$

and $20 = 100 \times 0.2$

So 2 in tens place is 100 times of digit 2 in tenth place.

Toby is wrong

10 ⟶ A , B

because $4.984 = 4 + 0.9 + 0.08 + 0.004$

$3.814 = 3 + 0.8 + 0.01 + 0.004$

So $0.8 = 10 \times 0.08$

$5.820 = 5 + 0.8 + 0.02 + 0.000$

So $0.8 = 10 \times 0.08$

On My Own

MATH REPLAY | GO ONLINE

Name _____

What is the word form of the decimal?

1. 8.2

2. 8.02

3. 0.82

4. 0.082

What is the standard form of the decimal?

5. 0.9 + 0.03 + 0.007

6. 20 + 0.7 + 0.08 + 0.006

7. 5 + 0.01 + 0.009

8. $7 + \frac{4}{10} + \frac{5}{1{,}000}$

What is each decimal in standard form?
What is each decimal in expanded form?

9. ninety-three and six thousandths

10. three and eight hundred forty-six thousandths

11. two hundred twelve and fifteen thousandths

12. seven hundred fifty-one thousandths

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PAGE – 73

QUESTION 1 – 12

1 8 . 2

Eight and two tenth

2 8 . 0 2

Eight and two hundredth

3 0 . 8 2

Eighty two hundredth

4 0 . 0 8 2

Eighty two thousandth

5 0.9 + 0.03 + 0.007

□ 0 . 9 3 7

6 20 + 0.7 + 0.08 + 0.006

2 0 . 7 8 6

7 $5 + 0.01 + 0.009$

	5	.	0	1	9

8 $7 + \frac{4}{10} + \frac{5}{1000}$

$7 + 0.4 + 0.005$

	7	.	4	0	5

9 ninety three → 93

and → .

six thousandths → .006

Standard form = 93.006

Expanded form

9	3	.	0	0	6
$\times 10$	$\times 1$		$\times \frac{1}{10}$	$\times \frac{1}{100}$	$\times \frac{1}{1000}$

$9 \times 10 + 3 \times 1 + 0 \times \frac{1}{10} + 0 \times \frac{1}{100} + 6 \times \frac{1}{1000}$

$90 + 3 + 0 + 0 + \frac{6}{1000}$

10

Three → 3

and → .

eight hundred forty six thousandth → .846

Standard form = 3.846

Expanded form

$\square \times 10 \quad 3 \times 1 \quad . \quad 8 \times \frac{1}{10} \quad 4 \times \frac{1}{100} \quad 6 \times \frac{1}{1000}$

$3 \times 1 + 8 \times \frac{1}{10} + 4 \times \frac{1}{100} + 6 \times \frac{1}{1000}$

$3 + \frac{8}{10} + \frac{4}{100} + \frac{6}{1000}$

11 Two hundred twelve → 212

and → .

fifteen thousandths → .015

Standard form = 212.015

Expanded form

$2 \times 100 \quad 1 \times 10 \quad 2 \times 1 \quad . \quad 0 \times \frac{1}{10} \quad 1 \times \frac{1}{100} \quad 5 \times \frac{1}{1000}$

$2\times100 + 1\times10 + 2\times1 + 0\times\frac{1}{10} + 1\times\frac{1}{100}$

$+ 5\times\frac{1}{1000}$

$200 + 10 + 2 + 0 + \frac{1}{100} + \frac{5}{1000}$

12 Seven hundred fifty one thousandths

↓

0.751

Standard form = 0.751

Expanded form

		.			
			7	5	1
$\times10$	$\times1$		$\times\frac{1}{10}$	$\times\frac{1}{100}$	$\times\frac{1}{1000}$

$7\times\frac{1}{10} + 5\times\frac{1}{100} + 1\times\frac{1}{1000}$

$\frac{7}{10} + \frac{5}{100} + \frac{1}{1000}$

Learn

Which bag weighs more?



3.281 kg 3.095 kg

Compare the digits in each place starting with the greatest place-value position.

ones	tenths	hundredths	thousandths
3	2	8	1
3	0	9	5

Both numbers have 3 ones.

2 tenths > 0 tenths

Math is... Thinking

Why was it not necessary to compare the hundredths place?

3.281 > 3.095. So, the purple bag weighs more than the red bag.

You can compare decimals the same way you compare multi-digit numbers.

Work Together

Compare the weights of these bags.

ones	tenths	hundredths	thousandths
3	2	8	1
3	9		



3.281 kg 3.9 kg

3.281 < 3.9

(9 > 2)

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On My Own

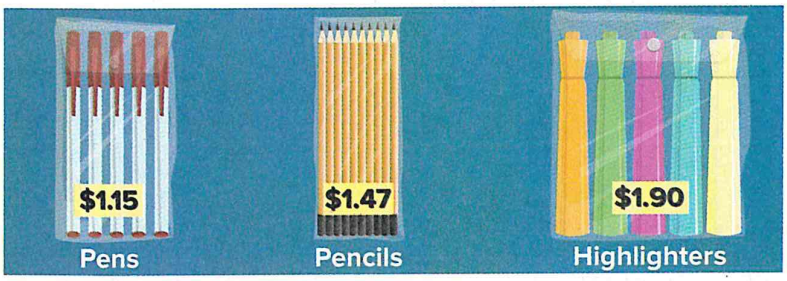
MATH REPLAY | GO ONLINE

Name _____

Write >, <, or = in each ◯ to make a true comparison. You can use a place-value chart to help.

1. 7.790 ◯ 8.7
2. 1.021 ◯ 1.095
3. 6.55 ◯ 5.66
4. 9.9 ◯ 0.99
5. 3.41 ◯ 3.41
6. 2.563 ◯ 2.573

For exercises 7–9, use the cost of each school supply.



7. Do the pencils or the highlighters cost more?

8. Write a comparison statement for the cost of the pens and the pencils.

9. Which school supply is the most expensive? Which school supply is the least expensive? Explain how you know.

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PAGE — 77

QUESTIONS 1 — 9

1 $7.790 < 8.7$

2 $1.021 < 1.095$

3 $6.55 > 5.66$

4 $9.9 > 0.99$

5 $3.41 = 3.41$

6 $2.563 < 2.573$

7 $1.90 > 1.15$

Highlighters Pencils

highlighters cost more

8 $1.15 < 1.47$

Pens Pencils

9

1.15 < 1.47 < 1.90

Pens Pencils highlighter

Pens are least expensive

Highlighters are most expensive

On My Own

MATH REPLAY | GO ONLINE

Name _____

What is each decimal rounded to the nearest whole number? You can use a number line or place value.

1. 78.39

2. 4.07

3. 12.7

4. 15.55

What is each decimal rounded to the nearest tenth? You can use a number line or place value.

5. 42.89

6. 3.65

7. 16.12

8. 98.17

9. Danica rounded a number to the nearest tenth to get 14.7. What number could she have rounded to get this answer?

10. Which statements are *true*?

A. The decimal 43.678 rounded to the nearest tenth is 43.6.

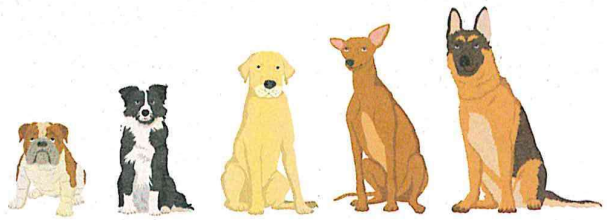
B. The decimal 43.678 rounded to the nearest tenth is 43.7.

C. The decimal 43.678 rounded to the nearest hundredth is 43.68.

D. The decimal 43.678 rounded to the nearest hundredth is 43.67.

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11. The masses of five different dogs are shown. Round each mass to the nearest whole number.



22.8 kg 25.4 kg 27.1 kg 25.8 kg 26.7 kg

PAGE – 83
QUESTIONS 1–10

1 78.39 , $3 < 5$

$= 78$

2 4.07 , $0 < 5$

$= 4$

3 12.7 , $7 > 5$

$+1$

$= 13$

4 15.55 , $5 = 5$

$+1$

$= 16$

5 42.89 , $9 > 5$

$+1$

$= 42.9$

6 3.65 , $5=5$

$= 3.7$

7 16.12 , $2<5$

$= 16.1$

8 98.17 , $7>5$

$= 98.2$

9 14.71 , $1<5$

14.7

OR

14.68 , $8>5$

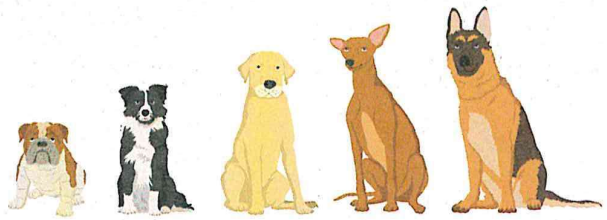
14.7

10 B

because 43.678 , $7>5$

43.7

11. The masses of five different dogs are shown. Round each mass to the nearest whole number.



22.8 kg 25.4 kg 27.1 kg 25.8 kg 26.7 kg

22.8 → 23 (+1)

8 > 5

25.4 → 25

4 < 5

27.1 → 27

1 < 5

25.8 → 26 (+1)

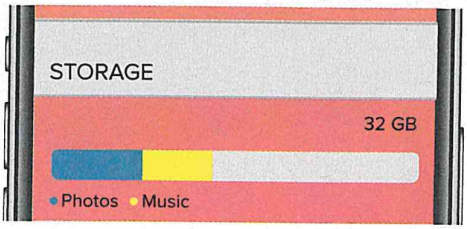
8 > 5

26.7 → 27 (+1)

7 > 5

Learn

A phone has 32 gigabytes of storage. Photos take up 8.25 gigabytes of this storage, and music takes up 3.62 gigabytes.



How can you determine about how many gigabytes of storage are left?

First, estimate how much storage the photos and music take up.

Use rounding to estimate the sum.

8.25 → 8
3.62 → 4

$8 + 4 = 12$

The photos and music take up about 12 gigabytes of storage.

Math is... Choosing Tools

What strategies do we know for estimating sums?

Next, use compatible numbers to estimate the difference.

32 → 32
11.87 → 12

$32 - 12 = 20$

The total storage of photos and music is 11.87 gigabytes. Is this sum reasonable?

The phone has about 20 gigabytes of storage left.

Strategies used to estimate sums and differences of whole numbers can also be used to estimate sums and differences of decimals. Estimating helps assess the reasonableness of calculated solutions.

Work Together

About how much more does Hero weigh than Layla? How did you determine which estimation strategy to use?

Layla



82.98

Hero



86.74

$86.74 - 82.98$

$+1 \downarrow \quad 7 > 5 \qquad +1 \downarrow \quad 9 > 5$

$87 - 83 = 4$

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On My Own

MATH REPLAY | GO ONLINE

Name _____

What is a reasonable estimate for the sum or difference? Explain the strategy you used.

1. 9.86 + 4.30
   8>5 3<5
   +1 → 10 + 4 = 14

2. 43.85 + 56.01
   8>5 0<5
   +1 → 44 + 56 = 100

3. 3.92 + 6.14
   9>5 1<5
   +1 → 4 + 6 = 10

4. 24.73 + 26.05
   7>5 0<5
   +1 → 25 + 26 = 51

5. 8.32 − 5.9
   3<5 9>5
   8 − 6 = 2 (+1)

6. 88.4 − 10.96
   4<5 9>5
   88 − 11 = 77 (+1)

7. 16.28 − 5.9
   2<5 9>5
   16 − 6 = 10 (+1)

8. 5.42 − 1.7
   4<5 7>5
   5 − 2 = 3 (+1)

9. **STEM Connection** A baby rabbit weighs 24.8 grams. A veterinarian predicts the rabbit will weigh about 64.5 grams by the next visit. About how much weight will the rabbit gain?
   8>5
   25 ← 24.8
   +1
   (5=5) +1 → 65

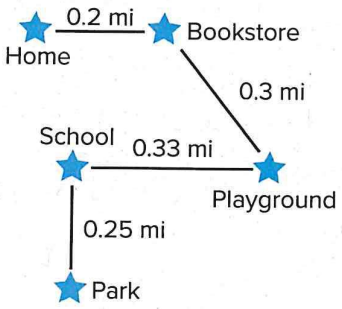
   65 − 25 = 41 grams



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Learn

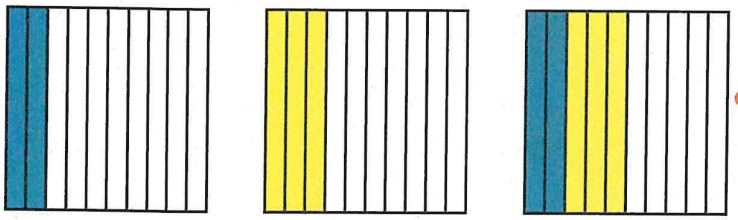
Deja drew a map showing the distances she walked.



How can you determine how far Deja walks from home to the bookstore, then to the playground? How can you determine how far she walks from the playground to the school, then to the park?

Deja walks from home to the bookstore, then to the playground.

0.2 + 0.3 = 0.5

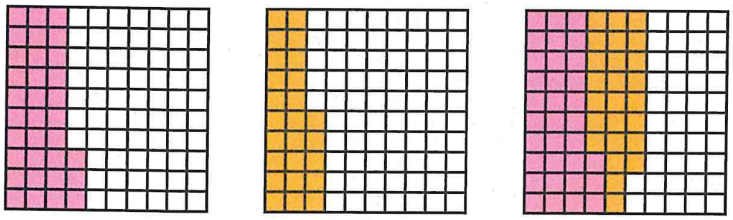


Decimal grids can help you solve the equation.

Deja walked 0.5 mile.

Deja walks from the playground to school, then to the park.

0.33 + 0.25 = 0.58



Deja walked 0.58 mile.

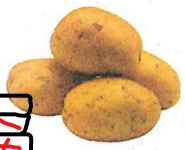
Math is... Choosing Tools

How are decimal grids helpful in determing the sum of two decimals?

You can use decimal grids to help solve addition equations involving decimals.

Work Together

René bought potatoes and turnips. How much do the potatoes and turnips weigh? Use decimal grids to solve.

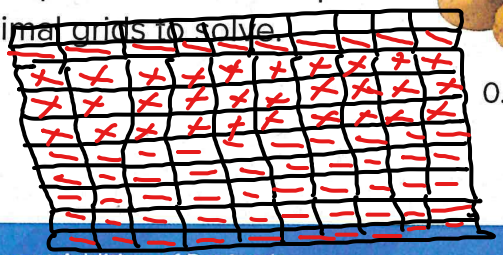


0.9 kg



0.3 kg

$$\begin{array}{r} 0.9 \\ -\ 0.3 \\ \hline 0.7 \end{array}$$

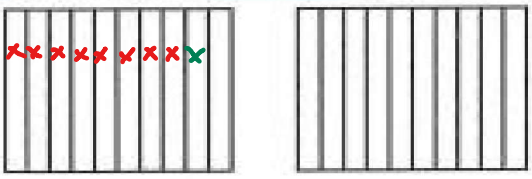


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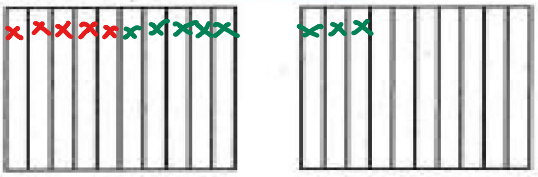
10	Lesson name	Example/Exercise	Page
	Represent addition of decimals	1-10	101

What is the sum? Use the decimal grids.

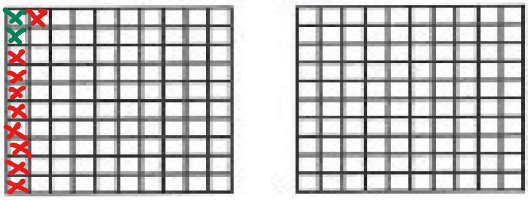
1. $0.7 + 0.1 =$ 0.8



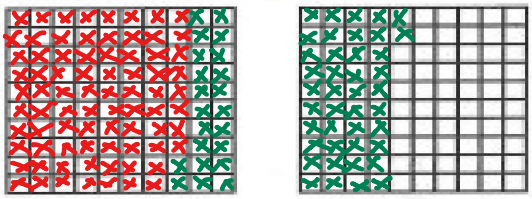
2. $0.5 + 0.8 =$ 1.3



3. $0.02 + 0.09 =$ 0.11

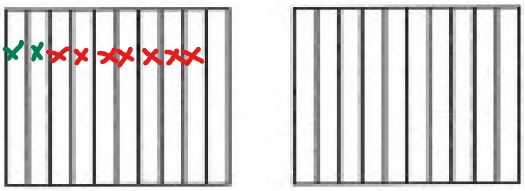


4. $0.78 + 0.64 =$ 1.42

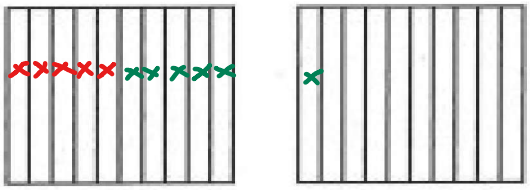


What is the sum? Use decimal grids to show the sum.

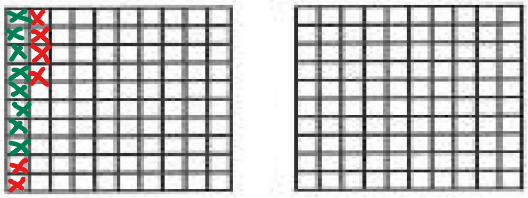
5. $0.2 + 0.7 =$ 0.9



6. $0.5 + 0.6 =$ 1.1

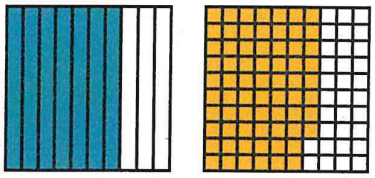


7. $0.08 + 0.06 =$ 0.14

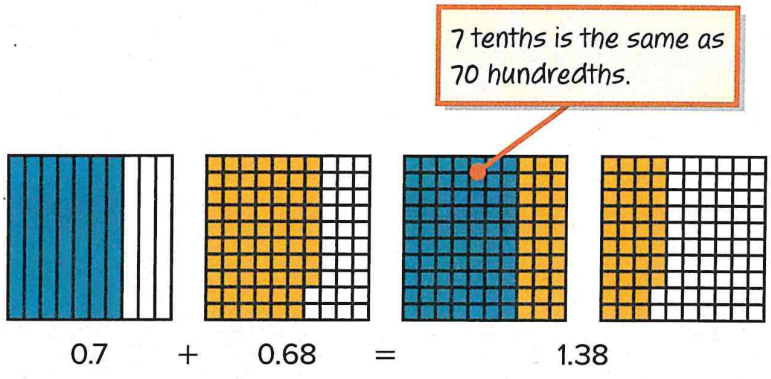


Learn

How can you determine the sum of 0.7 + 0.68?



You can use decimal grids to help you determine the sum.



Sometimes you need to represent tenths as hundredths to help solve addition equations involving decimals.

Math is... Structure

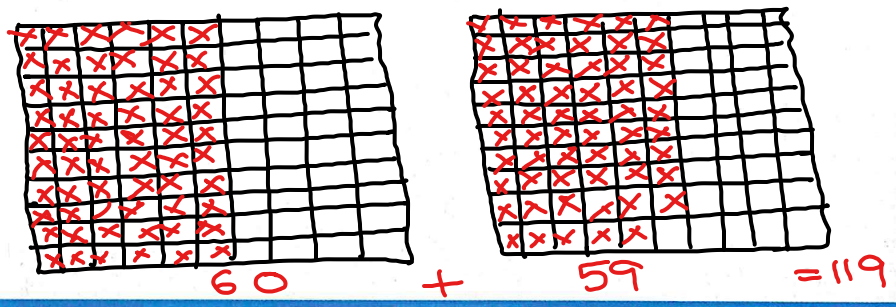
How is adding decimals similar to adding whole numbers?

Work Together

What is the total weight of the chocolate bits and raisins? Use a decimal grid to solve.

Ingredient	Weight (lb)
Chocolate bits	0.6
Raisins	0.59

0.6
0.59
1.19



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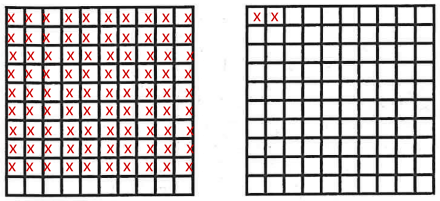
On My Own

MATH REPLAY | GO ONLINE

Name _____

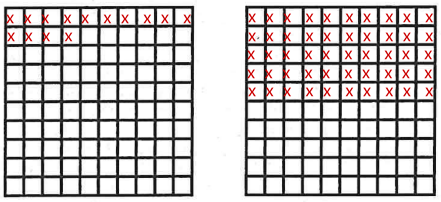
What is the sum? Use the decimal grids to solve.

1. 0.9 + 0.02 = 0.90+.02=0.92



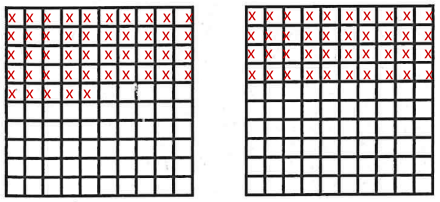
90 + 2 = 92

2. 0.14 + 0.5 = 0.14+0.50=0.64



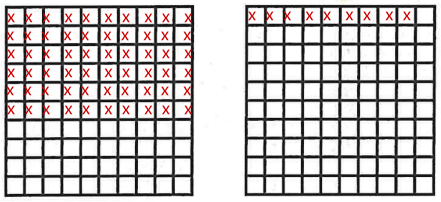
14 + 50 = 64

3. 0.45 + 0.4 = 0.45+0.40=0.85



45 + 40 = 85

4. 0.6 + 0.09 = 0.60+0.09=0.69



60 + 9 = 69

What is the sum? Use decimal grids to solve.

5. 0.7 + 0.18 = _____

6. 0.86 + 0.5 = _____

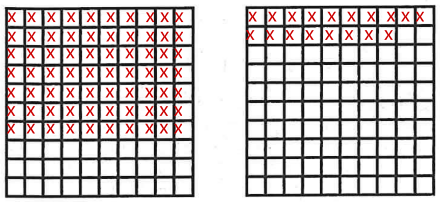
7. 0.44 + 0.6 = _____

8. 0.1 + 0.89 = _____

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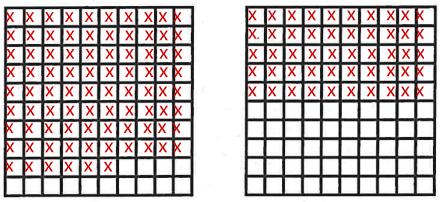
ANSWERS FOR QUESTIONS 5, 6, 7, 8

5. $0.7 + 0.18 = 0.70+0.18 = 0.88$



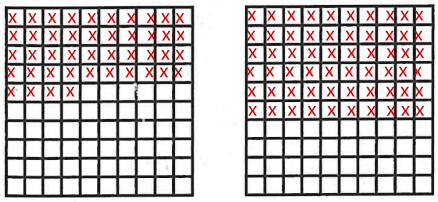
70 + 18 = 88

6. $0.86 + 0.5 = 0.86+0.50=1.36$



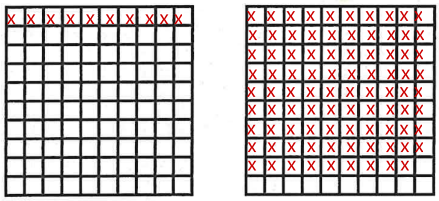
86 + 50 = 136

7. $0.44 + 0.6 = 0.44+0.60=1.04$



44 + 60 = 104

8. $0.1 + 0.89 = 0.10+0.89=0.99$



10 + 89 = 99

Learn

How can you determine the total cost of the helicopter and robot?



$17.31



$12.45

Math is... Modeling

What equation can you use to represent the problem?

You can use partial sums to determine the total cost.

One Way Decompose by place value.

$17.31 + 12.45 = c$

$10 + 7 + 0.3 + 0.01 \qquad 10 + 2 + 0.4 + 0.05$

$10 + 10 = 20$
$7 + 2 = 9$
$0.3 + 0.4 = 0.7$
$0.01 + 0.05 = 0.06$

Find partial sums

Add partial sums to find the sum

$20 + 9 + 0.7 + 0.06 = 29.76$

Another Way Decompose into whole numbers and decimals.

$17.31 + 12.45 = c$

$17 + 0.31 \qquad 12 + 0.45$

$17 + 12 = 29$
$0.31 + 0.45 = 0.76$

Find partial sums

Add partial sums to find the sum

$29 + 0.76 = 29.76$

We can decompose decimals different ways to find partial sums.

Work Together

Michael drove 23.06 kilometers on Saturday and 16.38 kilometers on Sunday. What is the total distance he drove during the two days?

23.06 → $23 + 0.06$ → $23 + 16$

16.38 → $16 + 0.38$ → $0.06 + 0.38$

$39 + 0.44 = 39.44$

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On My Own

MATH REPLAY | GO ONLINE

Name _____

What is the sum? Use partial sums to solve.

1. $2.57 + 8.4$
   $= 2 + 0.5 + 0.07 + 8 + 0.4$
   $=$ _____

2. $6.9 + 0.31$
   $= 6 + 0.9 + 0.3 + 0.01$
   $=$ _____

3. $35.12 + 64.73 =$ _____

4. $70.34 + 21.52 =$ _____

5. $14.53 + 11.2 =$ _____

6. $104.75 + 21.9 =$ _____

7. Mattis earns $22.50 shoveling snow. Later, he finds $0.82 in his backpack. How much money does he have now?

8. Josh's suitcase weighs 13.4 pounds. Karen's suitcase weighs 21.63 pounds. What is the total weight of the two suitcases?

9. Kim's goal was to run at least 10 miles this week to train for her cross-country race. On Tuesday she ran 3.57 miles, and on Wednesday she ran 6.48 miles. Did Kim reach her goal? Explain.

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PAGE - 109

QUESTIONS 1-9

1 $2.57 + 8.4$

$= 2 + 0.5 + 0.07 + 8 + 0.4$

$2 + 8 = 10$

$0.5 + 0.4 = 0.9$

$0.07 = 0.07$

$+$

10.97

2. $6.9 + 0.31$

$= 6 + 0.9 + 0.3 + 0.01$

$6 = 6$

$0.9 + 0.3 = 1.2$

$0.01 = +0.01$

7.21

3 $35.12 + 64.73$

$35 + 0.1 + 0.02 + 64 + 0.7 + 0.03$

$35 + 64 = 99$

$0.1 + 0.7 = 0.8$

$0.02 + 0.03 = 0.05$

$+$

99.85

---

4 $70.34 + 21.52$

$70 + 0.3 + 0.04 + 21 + 0.5 + 0.02$

$70 + 21 = 91$

$0.3 + 0.5 = 0.8$

$0.04 + 0.02 = 0.06$

$+$

91.86

---

5 $14.53 + 11.2$

$14 + 0.5 + 0.03 + 11 + 0.2$

$14 + 11 = 25$

$0.5 + 0.2 = 0.7$

$0.03 = 0.03$

$+$

25.73

---

6 $104.75 + 21.9$

$104 + 0.7 + 0.05 + 21 + 0.9$

$104 + 21 = 125$

$0.7 + 0.9 = 1.6$

$0.05 = 0.05$

$+$

126.65

---

7 $22.50 + 0.82$

$22 + 0.5 + 0.00 + 0.8 + 0.02$

$22 = 22$

$0.5 + 0.8 = 1.3$

$0.00 + 0.20 = + 0.02$

23.52

8 $13.4 + 21.63$

$13 + 0.4 + 21 + 0.6 + 0.03$

$13 + 21 = 34$

$0.4 + 0.6 = 1.0$

$0.03 = + 0.03$

35.03

9 $3.57 + 6.48$

$3 + 0.5 + 0.07 + 6 + 0.4 + 0.08$

$3 + 6 = 9$

$0.5 + 0.4 = 0.9$

$0.07 + 0.08 = + 0.15$

10.05

Learn

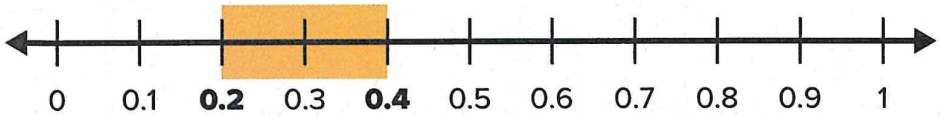
The table shows the decimals represented by different colors on a decimal grid.

How can you determine how much more is shaded red than green? Yellow than purple?

Color	Decimal
Red	0.4
Green	0.2
Yellow	0.36
Purple	0.04

Use a number line to find how much more is shaded red than green.

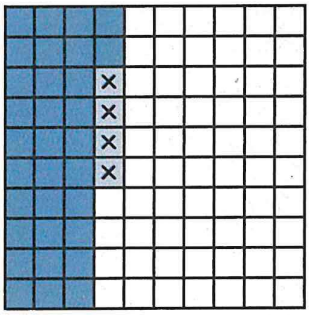
$0.4 - 0.2 = r$



There is 0.2 more shaded red than green.

Use a decimal grid to find how much more is shaded yellow than purple.

$0.36 - 0.04 = y$



There is 0.32 more shaded yellow than purple.

Math is... Precision

How is each quantity shown on the decimal grid?

You can use a number line or decimal grid to subtract decimals.

Work Together

How much greater is the mass of an emu egg than a chicken egg? Explain.

$$\begin{array}{r} 0.62 \\ -\ 0.06 \\ \hline 0.56 \text{ kg} \end{array}$$



Chicken egg
0.06 kg



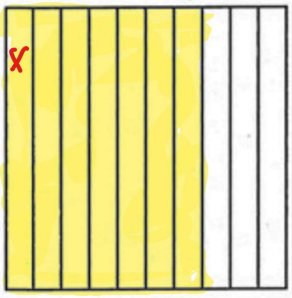
Emu egg
0.62 kg

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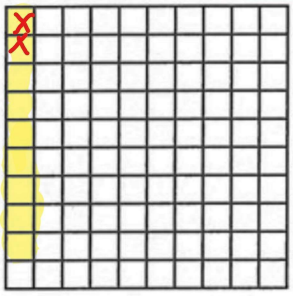
12	Represent Subtraction of Decimals	[redacted] (1-7)	Page [redacted] 113

What is the difference? Use the decimal grid to solve.

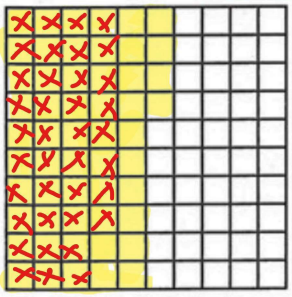
1. $0.7 - 0.1 =$ 0.6



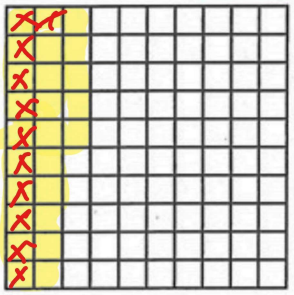
2. $0.09 - 0.02 =$ 0.07



3. $0.54 - 0.38 =$ 0.16

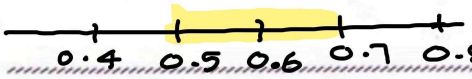


4. $0.25 - 0.11 =$ 0.14

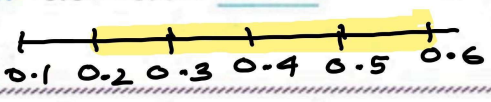


What is the difference? Use a number line to solve.

5. $0.7 - 0.2 =$ 0.5



6. $0.6 - 0.4 =$ 0.2



7. Malik has \$0.85. He bought a pencil for \$0.50. Does he have enough money left to buy a folder for \$0.30? Explain.

Money left after buying pencil

$$\begin{array}{r} 0.85 \\ -\ 0.50 \\ \hline 0.35 \end{array}$$

Yes he has 0.35 \$ left, so he can buy the folder

Learn

The table shows different lengths of insects.

How can you find how much longer the ant is than the aphid? The beetle than the ladybug?

Insect	Length (cm)
Beetle	0.7
Ant	0.64
Ladybug	0.43
Aphid	0.3

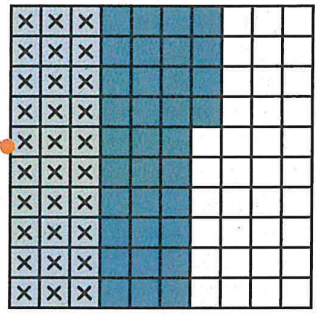
You can use subtraction to find the differences in lengths.

Find how much longer the ant is than the aphid.

$0.64 - 0.3 = 0.34$

The ant is 0.34 centimeter longer than the aphid.

0.3 is the same as 0.30.



Math is... Perseverance

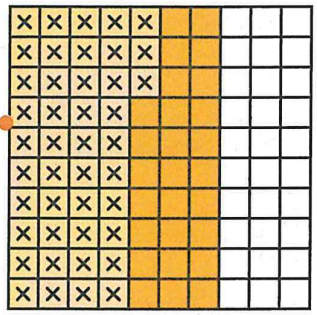
How can you use addition to check that the answer is correct?

Find how much longer the beetle is than the ladybug.

$0.7 - 0.43 = 0.27$

The beetle is 0.27 centimeter longer than the ladybug.

0.7 is the same as 0.70.



Sometimes you need to convert tenths to hundredths to help solve subtraction equations involving decimals.

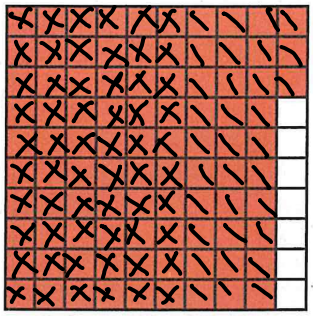
Work Together

Marcus is using a decimal grid to solve $0.93 - 0.6 = r$.

How can he show subtracting 0.6?

Explain your reasoning.

$$\begin{array}{r} 0.93 \\ -0.6 \\ \hline 0.33 \end{array} \qquad \begin{array}{r} 93 \\ -60 \\ \hline 33 \end{array}$$

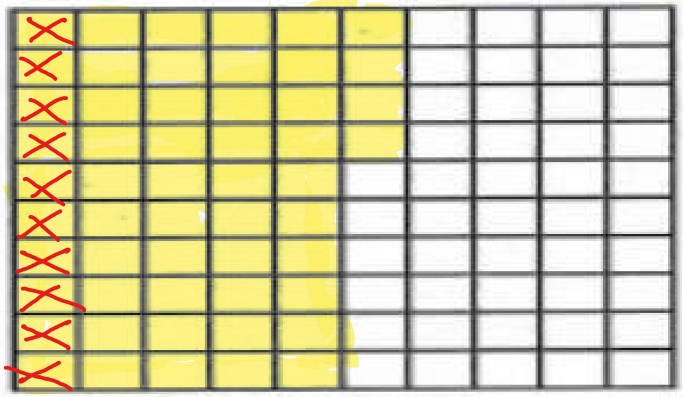


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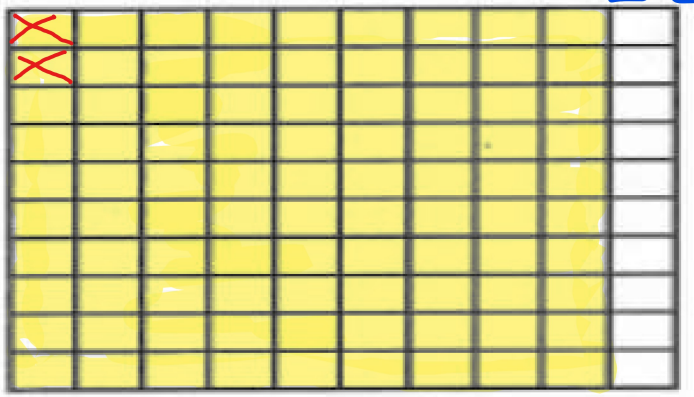
PAGE - 117

What is the difference? Use the decimal grids to solve.

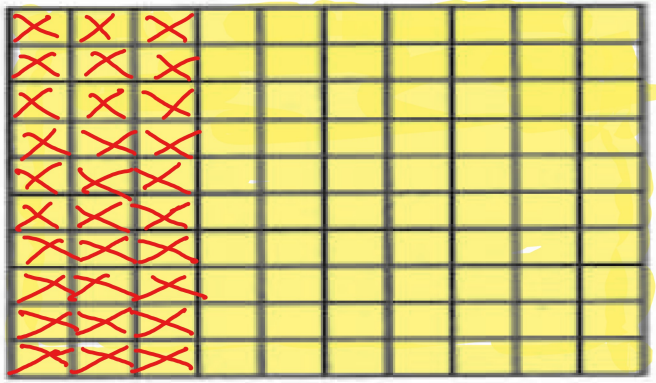
1. $0.54 - 0.1 = 0.54 - 0.10 = 0.44$

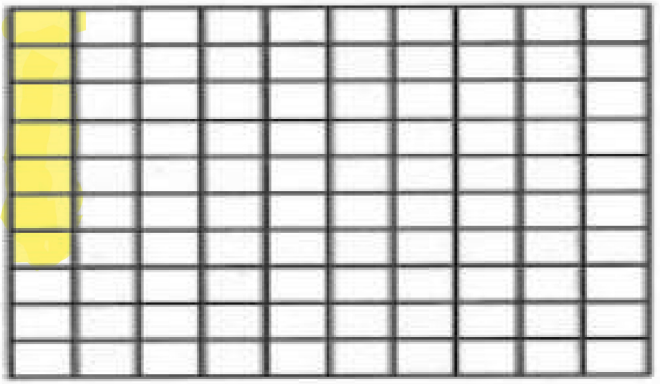


2. $0.9 - 0.02 = 0.90 - 0.02 = 0.88$



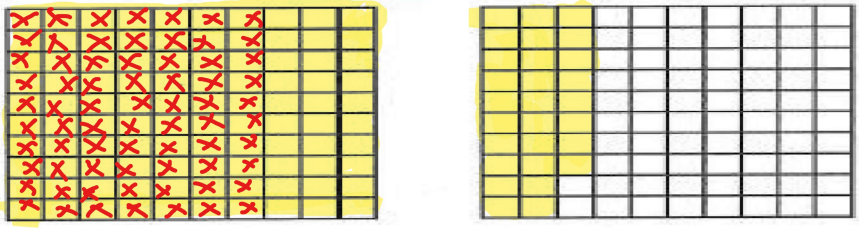
3. $1.07 - 0.3 = 1.07 - 0.30 = 0.77$





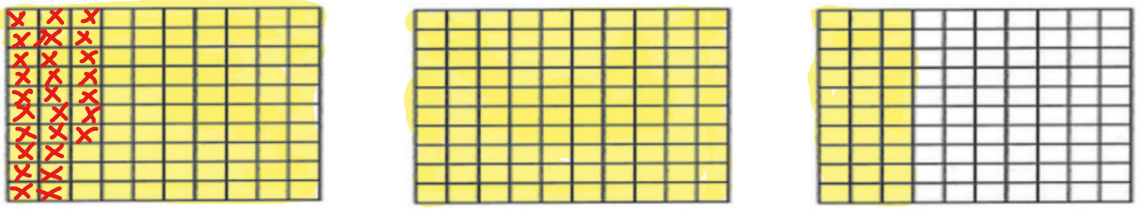
3	Lesson name	Example/Exercise	Page
	Represent subtraction of tenths and hundredths	1-8	117

4. $1.28 - 0.7 =$ $1.28 - 0.70 = 0.58$

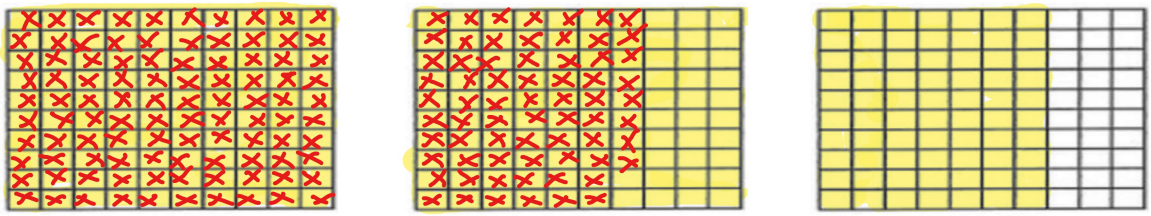


What is the difference? Use decimal grids to solve.

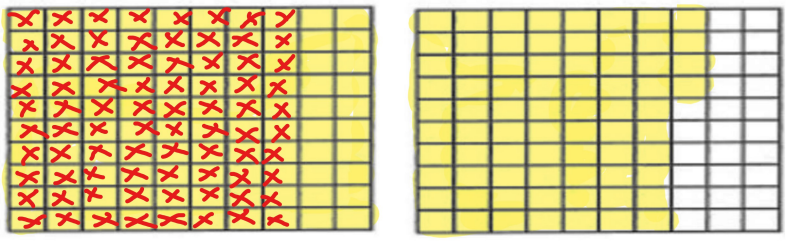
5. $2.3 - 0.27 =$ $2.30 - 0.27 = 2.03$



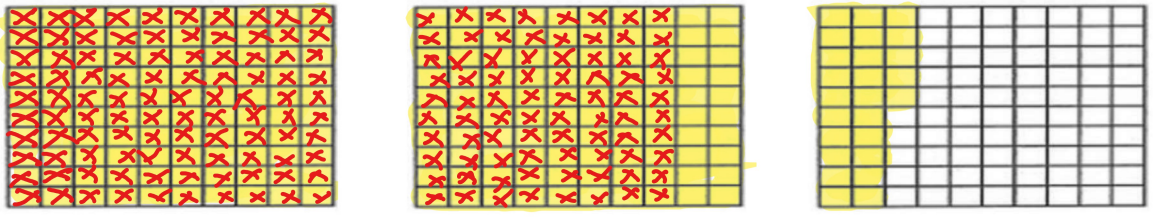
6. $2.7 - 1.68 =$ $2.70 - 1.68 = 1.02$



7. $1.74 - 0.8 =$ $1.74 - 0.80 = 0.94$



8. $2.25 - 1.8 =$ $2.25 - 1.80 = 0.45$



Learn

How can you determine how much more precipitation Olympia, Washington receives than Salem, Oregon?

Average Precipitation for November–January



One Way Decompose by place value to subtract.

$23.89 - 19.29 = p$

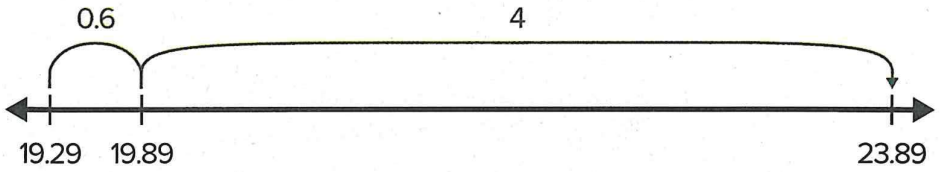
$23.89 - 10 = 13.89$
$13.89 - 9 = 4.89$
$4.89 - 0.2 = 4.69$
$4.69 - 0.09 = \mathbf{4.60}$

Math is... Choosing Tools

Is the calculated answer reasonable? How do you know?

Another Way Count on a number line to subtract.

$19.29 + p = 23.89$



$19.29 + \mathbf{4.6} = 23.89$

On average, Olympia receives 4.6 inches more precipitation than Salem.

You can use the same strategies to subtract decimals as you did to subtract whole numbers.

Work Together

Find the difference and explain your strategy.

$57 - 32.64$

$57 - 32 = 25$
$25 - 0.6 = 24.4$
$24.4 - 0.04 = 24.36$

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On My Own

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Name _____

Decompose by place value to find the difference.

1. 8.57 − 2.4

   8.57 − 2 = _____

   _____ − 0.4 = _____

   8.57 − 2.4 = _____

2. 7.73 − 5.1

   7.73 − 5 = _____

   _____ − 0.1 = _____

   7.73 − 5.1 = _____

Count on to find the difference.

3. 6.31 − 0.9 = _____



4. 64.19 − 35.75 = _____



What is the difference? Show your work.

5. 36.33 − 32.29 = _____

6. 48.56 − 18.21 = _____

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PAGE – 121
QUESTIONS 1–6

1 $8.57 - 2.4$

$8.57 - 2 = 6.57$

$0.57 - 0.4 = 0.17$

$8.57 - 2.4 = 6.17$

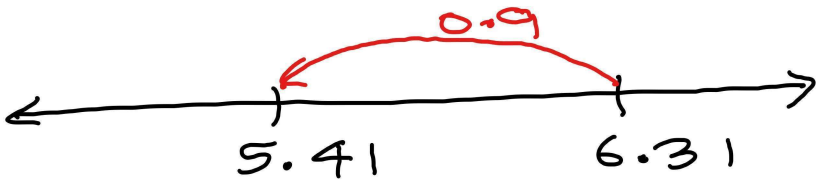
2 $7.73 - 5.1$

$7.73 - 5 = 2.73$

$0.73 - 0.1 = 0.63$

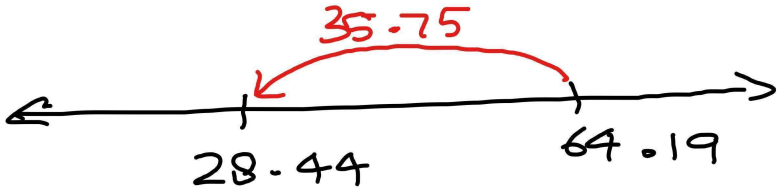
$7.73 - 5.1 = 2.63$

3 $6.31 - 0.9 = 5.41$



$$\begin{array}{r} {}^{5}\cancel{6}.{}^{+10}3\,1 \\ 0.9 \\ \hline 5.41 \end{array}$$

4 $64.19 - 35.75 = 28.44$



$$\begin{array}{r} {}^{5}\cancel{6}\overset{13}{\cancel{4}}.{}^{+10}9 \\ -\ 35.75 \\ \hline 28.44 \end{array}$$

5 $36.33 - 32.29$

$36 - 32 = 4$

$0.33 - 0.29 = +0.04$

4.04

6

$$48.56 - 18.21$$

$$48 - 18 = 30$$

$$0.56 - 0.21 = +\ 0.35$$

$$30.35$$

Learn

At Week 1, Dean had 10 pennies Each week after, Dean increased the number of pennies by 10 times the previous week.

During which week will Dean have 1,000,000 pennies?

You can organize the information in a table to help determine the solution.

Math is... Patterns

What patterns do you notice in the table?

Week	Multiplication Expression	Number of Pennies Added each Week
1	10	10
2	10 × 10	100
3	10 × 10 × 10	1,000
4	10 × 10 × 10 × 10	10,000
5	10 × 10 × 10 × 10 × 10	100,000
6	10 × 10 × 10 × 10 × 10 × 10	1,000,000

A **power of 10** is the product of 10 multiplied by itself a number of times.

Dean will have 1,000,000 pennies in Week 6.

You can write a power of 10 as a multplication expression with factors of 10.

You can also write a power of 10 in **exponential form** using a **base** and an **exponent**.

$\underbrace{10 \times 10}_{\text{2 factors}} = 10^{2}$ ← exponent

↑ base

Work Together

Write 10^8 as a multiplication expression. Then, find the product.

$10^8 = 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$

$= 100000000$

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Write the exponential form as a multiplication expression.

1. $10^4 = 10 \times 10 \times 10 \times 10$
2. $10^2 = 10 \times 10$
3. $10^3 = 10 \times 10 \times 10$
4. $10^6 = 10 \times 10 \times 10 \times 10 \times 10 \times 10$

Write the exponential form.

5. $10 \times 10 \times 10 = 10^3$
6. $10 \times 10 \times 10 \times 10 \times 10 = 10^5$
7. $10 \times 10 \times 10 \times 10 = 10^4$
8. $10 \times 10 = 10^2$

Write the exponential form of each power of 10.

9. $10 = 10^1$
10. $1{,}000 = 10^3$
11. $100 = 10^2$
12. $10{,}000 = 10^4$

13. Rachel finds the value of 10^5 as shown. Do you agree with her solution? Tell why.

$10^5 = 10 \times 5 = 50$ No

$10^5 = 100000$

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14	Patterns When Multiplying a Whole Number by Powers of 10	(1-13)	Page 141

What is the product? Use patterns to solve.

1. $12 \times 10 =$ 120
   $12 \times 100 =$ 1200
   $12 \times 1{,}000 =$ 12000

2. $24 \times 1{,}000 =$ 24000
   $24 \times 10{,}000 =$ 240000
   $24 \times 100{,}000 =$ 2400000

3. $33 \times 10^2 = 33 \times 100 = 3300$
   $33 \times 10^3 = 33 \times 1000 = 33000$
   $33 \times 10^4 = 33 \times 10000 = 330000$

4. $57 \times 10^4 = 57 \times 10000 = 570000$
   $57 \times 10^5 = 57 \times 100000 = 5700000$
   $57 \times 10^6 = 57 \times 1000000 = 57000000$

What is the product?

5. $23 \times 10^3 = 23 \times 1000 = 23000$

6. $581 \times 10^2 = 581 \times 100 = 58100$

7. $60 \times 10^4 = 60 \times 10000 = 600000$

8. $103 \times 10^2 = 103 \times 100 = 10300$

What is the unknown factor?

9. $571 \times$ 10 $= 5{,}710$

10. $43 \times$ 100000 $= 4{,}300{,}000$

11. $6 \times$ 1000 $= 6{,}000$

12. $28 \times$ 10000 $= 280{,}000$

13. How can you describe the relationship between the equations shown?

$6 \times 10^5 = 600{,}000$
$6 \times 10^7 = 60{,}000{,}000$ → $6 \times 10^5 \times 100 = 60{,}000{,}000$
$6 \times 10^9 = 6{,}000{,}000{,}000$ → $6 \times 10^5 \times 10000 = 6{,}000{,}000{,}000$

Learn

On Saturday, 432 people go to the theater.

About how much money does the theater collect on Saturday?



You can use strategies you know to determine a reasonable estimate.

One Way Compatible numbers

432×13

$400 \times 15 = 4 \times 100 \times 15$
$= 4 \times 15 \times 100$
$= 6{,}000$

The theater collects about $6,000.

Another Way Rounded factors

432×13

$430 \times 10 = 4{,}300$

The theater collects about $4,300.

A reasonable estimate is between $4,300 and $6,000.

You can use these estimates to determine that the calculated solution of $5,616 is a reasonable answer.

Math is... Choosing Tools

What can and can't an estimated product tell you?

Estimated products can help you determine whether calculations are reasonable.

Work Together

Estimate the product of 879×36.

Which strategy did you use? Explain why.

Estimate of 879 = 900
Estimate of 36 = 40
900 x 40
= 36000

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On My Own

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Name _____

Estimate the product.

1. 643 × 18

2. 325 × 62

3. 438 × 27

4. 572 × 49

5. On a school trip, 54 students went to a museum. Each ticket cost $23. About how much did all students spend on tickets?

6. The town library has 478 shelves. Each shelf holds 38 books. About how many books does the library have?

7. A vendor at a fair is selling her paintings for $23 each. Over the course of the fair, 339 people purchase her paintings. About how much did the vendor earn over the course of the fair?

8. The fifth graders sold 405 baked goods at the bake sale. About how much did the fifth graders earn?



9. **Error Analysis** Han estimates that the product of 492 and 32 will be 1,200. How do you respond to Han?

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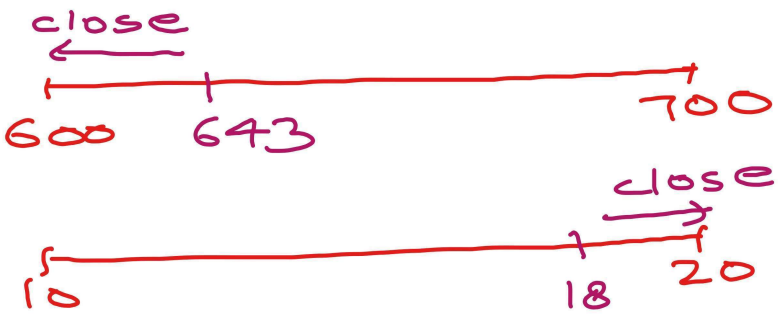
PAGE - 145

QUESTIONS 1-9

1 643 x 18

600 x 20

12000



2 325 x 62

300 x 60

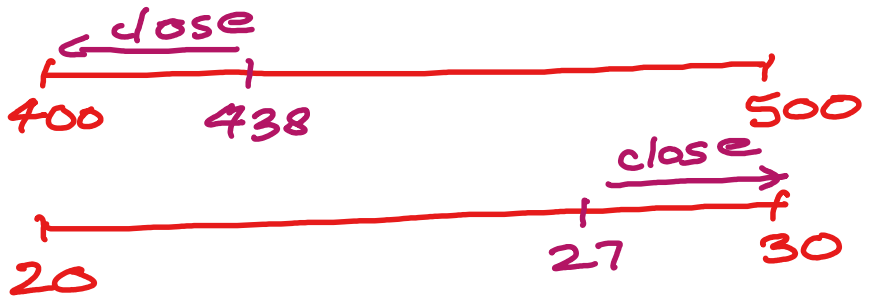
18000



3 438×27

400×30

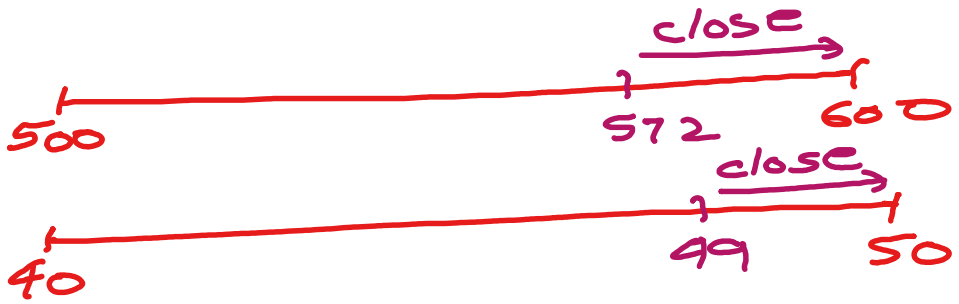
12000



4 572×49

600×50

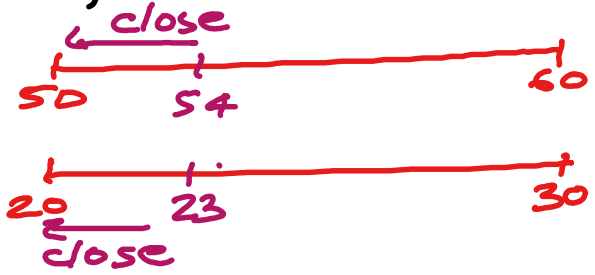
$30,000$



5 Spend on tickets $= 54 \times 23$

$= 50 \times 20$

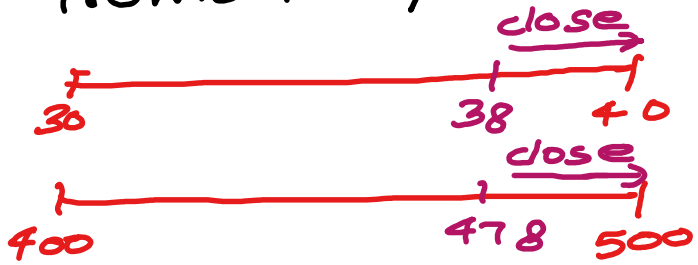
$= 1000\$$



6 Number of books $= 38 \times 478$

$= 40 \times 500$

$= 20,000$

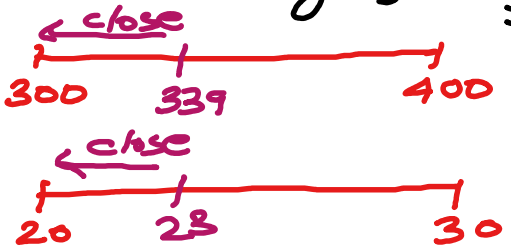


7 Earning from the course

$= 339 \times 23$

$= 300 \times 20$

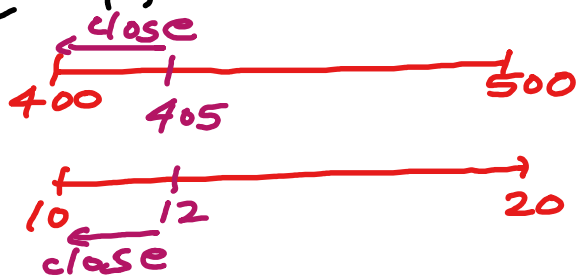
$= 6000\$$



8 He earned $= 405 \times 12$

$= 400 \times 10$

$= 4000\$$

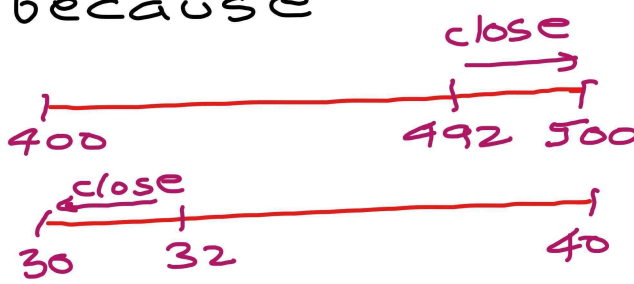


9 I will not agree because

$= 492 \times 32$

$= 500 \times 30$

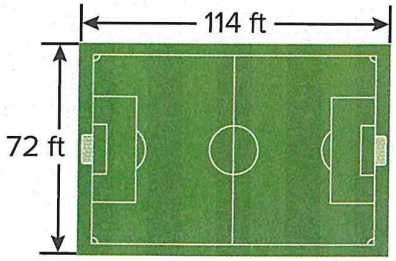
$= 15,000$



Learn

How can you determine the area of the youth soccer field?

You can use an area model to solve 72 × 114 = A.



Decompose the factors by place value.

	100	+ 10	+ 4
70			
+ 2			

Determine partial products.

	100	+ 10	+ 4
70	7,000	700	280
+ 2	200	20	8

Math is... Modeling

How does an area model help you understand multiplication?

Add the partial products to determine the product.

7,000 + 700 + 280 + 200 + 20 + 8 = 8,208

The area of the soccer field is 8,208 square feet.

You can use area models to multiply multi-digit factors.

Work Together

Use an area model and partial products to determine the product of 304 × 68.

	300	+ 00 +	4
60	300×60 18000	60×00 0	60×4 240
+ 8	8×300 2400	8×0 0	8×4 32

18000 + 2400 + 0 + 0 + 240 + 32
= 20672

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On My Own

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Name _____

Complete the area model. Then solve to find the product.

1.

	100	+ 50	+ 4
30	3,000		
+ 6	600		

2.

	400	+ 20	+ 1
50	20,000		50
+ 2			

What is the product? Use area models to solve.

3. $15 \times 24 =$ _____

	24
15	

4. $28 \times 132 =$ _____

	132
28	

5. $33 \times 78 =$ _____

6. $72 \times 225 =$ _____

Write the multiplication equation based on the area model. Then solve to find the product.

7.

	200	+ 10	+ 8
20			
+ 8			

8.

	400	+ 10	+ 6
60			
+ 3			

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PAGE – 149

QUESTIONS 1 – 8

1

	100	+ 50	+ 4
30	30 x 100 = 3000	30 x 50 = 1500	30 x 4 = 120
+ 6	100 x 6 = 600	50 x 6 = 300	4 x 6 = 24

$$\begin{array}{r} 3000 \\ 1500 \\ 600 \\ 300 \\ 120 \\ +\quad 24 \\ \hline 5544 \end{array}$$

$$154 \times 36 = 5544$$

2

	400	+ 20	+ 1
50	50 x 400 = 20,000	50 x 20 = 1000	50 x 1 = 50
+ 2	2 x 400 = 800	2 x 20 = 40	2 x 1 = 2

$$\begin{array}{r} 20,000 \\ 1000 \\ 800 \\ 40 \\ 50 \\ +\quad 2 \\ \hline 21,892 \end{array}$$

$$421 \times 52 = 21,892$$

3 15×24

$15 \rightarrow 10 + 5$ $\quad 24 \rightarrow 20 + 4$

	10	+ 5
20	$20 \times 10 = 200$	$20 \times 5 = 100$
+ 4	$4 \times 10 = 40$	$4 \times 5 = 20$

$$\begin{array}{r} 200 \\ 100 \\ 40 \\ +\ 20 \\ \hline 360 \end{array}$$

$15 \times 24 = 360$

4 28×132

$28 \rightarrow 20 + 8$ $\quad 132 \rightarrow 100 + 30 + 2$

	100	+ 30	+ 2
20	$20 \times 100 = 2000$	$20 \times 30 = 600$	$20 \times 2 = 40$
+ 8	$8 \times 100 = 800$	$8 \times 30 = 240$	$8 \times 2 = 16$

$$\begin{array}{r} 2000 \\ 800 \\ 600 \\ 240 \\ 40 \\ +\ 16 \\ \hline 3696 \end{array}$$

$132 \times 28 = 3696$

5 33×78

$33 \rightarrow 30 + 3$ $\quad 78 \rightarrow 70 + 8$

	30	+ 3
70	$70 \times 30 = 2100$	$70 \times 3 = 210$
+ 8	$8 \times 30 = 240$	$8 \times 3 = 24$

$$\begin{array}{r} 2100 \\ 240 \\ 210 \\ +\ 24 \\ \hline 2574 \end{array}$$

33 x 78 = 2574

6 72×225

$70 + 2$ $\quad$ $200 + 20 + 5$

70 + 2	200	20	5
70	$70 \times 200 = 14000$	$70 \times 20 = 1400$	$70 \times 5 = 350$
2	$2 \times 200 = 400$	$2 \times 20 = 40$	$2 \times 5 = 10$

$72 \times 225 = 16,200$

$$\begin{array}{r} {}^{1}{}^{1} \\ 14,000 \\ 1400 \\ 350 \\ 400 \\ 40 \\ +\quad 10 \\ \hline 16200 \end{array}$$

7

$200 + 10 + 8$

20 + 8	200	10	8
20	$20 \times 200 = 4000$	$20 \times 10 = 200$	$20 \times 8 = 160$
8	$8 \times 200 = 1600$	$8 \times 10 = 80$	$8 \times 8 = 64$

$200 + 10 + 8 = 218$

$20 + 8 = 28$

EQUATION IS 218×28

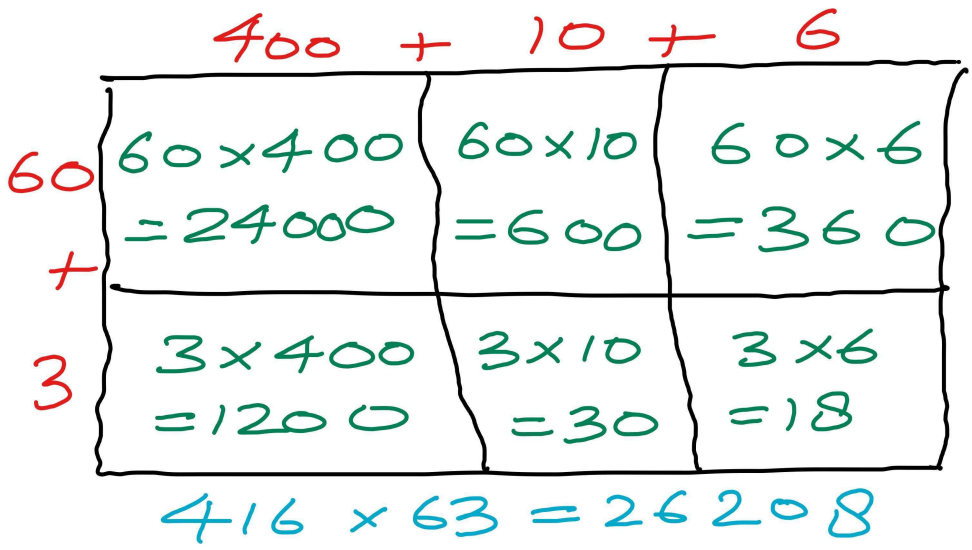
$$\begin{array}{r} {}^{2}{}^{1} \\ 4200 \\ 1600 \\ 200 \\ 160 \\ 80 \\ +\quad 64 \\ \hline 6104 \end{array}$$

$218 \times 28 = 6104$

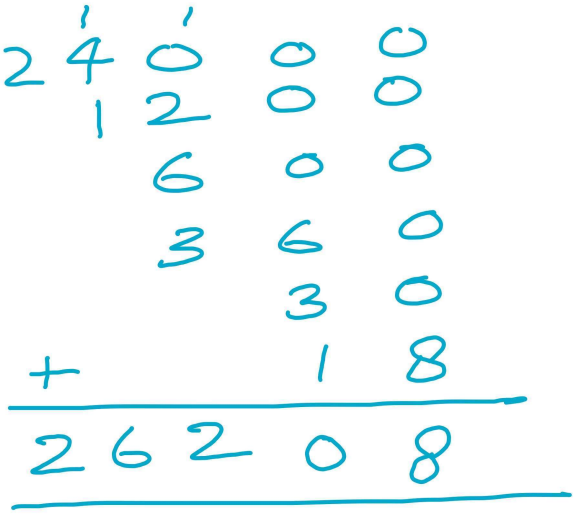
8 $400 + 10 + 6 = 416$

$60 + 3 = 63$

EQUATION IS 416×63



416 x 63 = 26208



Learn

A stadium has 164 rows of seats.

How many seats are in the stadium?



You can use partial products to solve the problem.

Decompose the factors by place value.

$164 = 100 + 60 + 4$

$82 = 80 + 2$

Determine the partial products.

$$\begin{array}{r} 164 \\ \times\ 82 \\ \hline 8{,}000 \leftarrow 80 \times 100 \\ 4{,}800 \leftarrow 80 \times 60 \\ 320 \leftarrow 80 \times 4 \\ 200 \leftarrow 2 \times 100 \\ 120 \leftarrow 2 \times 60 \\ +\ \ 8 \leftarrow 2 \times 4 \\ \hline 13{,}448 \end{array}$$

Multiply 80 by 100, 60, and 4.

Multiply 2 by 100, 60, and 4.

Add the partial products.

There are 13,448 seats in the stadium.

Math is... Generalizations

How does the area model help you understand how this strategy works?

Partial products is another multiplication strategy you can use to multiply multi-digit whole numbers.

Work Together

What is the product? Use partial products to solve.

Show 142 × 63 vertically.

142 = 100 + 40 + 2

× 63 = 60 + 3

6000 ← 100 × 60

300 ← 100 × 3

2400 ← 40 × 60

120 ← 40 × 3

120 ← 2 × 60

\+ 6 ← 2 × 3

8946

142 × 63 = 8946

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On My Own

MATH REPLAY | GO ONLINE

Name _____

Find the unknown partial products. Then find the product.

1.

$$\begin{array}{r} 325 \\ \times \quad 73 \\ \hline 21{,}000 \\ 1{,}400 \\ 350 \\ \square \\ \square \\ + \quad \square \\ \hline \square \end{array}$$

2.

$$\begin{array}{r} 104 \\ \times \quad 28 \\ \hline 32 \\ 800 \\ \square \\ + \quad \square \\ \hline \square \end{array}$$

What is the product? Use partial products to solve.

3.

$$\begin{array}{r} 17 \\ \times 86 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 24 \\ \times 129 \\ \hline \end{array}$$

5.

$$\begin{array}{r} 36 \\ \times 93 \\ \hline \end{array}$$

6.

$$\begin{array}{r} 222 \\ \times 58 \\ \hline \end{array}$$

7. A sporting goods store sold 24 mountain bikes. How much money did they make selling bikes?



8. The store also sold 12 mountain bike and scooter packages each for $367. How much money did they make?

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PAGE – 153

QUESTIONS 1 – 8

1

$$
\begin{array}{rr}
 & 325 \rightarrow 300+20+5 \\
\times & 73 \rightarrow 70+3 \\
\hline
21000 & \leftarrow 300\times 70 \\
14000 & \leftarrow 20\times 70 \\
3500 & \leftarrow 5\times 70 \\
900 & \leftarrow 300\times 3 \\
60 & \leftarrow 20\times 3 \\
+\quad 15 & \leftarrow 5\times 3 \\
\hline
23725 &
\end{array}
$$

2

$$
\begin{array}{rr}
 & 104 \rightarrow 100+00+4 \\
\times & 28 \rightarrow 20+8 \\
\hline
2000 & \leftarrow 100\times 20 \\
00 & \leftarrow 00\times 20 \\
80 & \leftarrow 4\times 20 \\
800 & \leftarrow 100\times 8 \\
00 & \leftarrow 00\times 8 \\
+\quad 32 & \leftarrow 4\times 8 \\
\hline
2912 &
\end{array}
$$

3

$$
\begin{array}{rl}
 & 17 \longrightarrow 10+7 \\
\times & 86 \longrightarrow 80+6 \\
\hline
 & 800 \leftarrow 10\times 80 \\
 & 560 \leftarrow 7\times 80 \\
 & 60 \leftarrow 10\times 6 \\
+ & 42 \leftarrow 7\times 6 \\
\hline
 & 1462 \\
\hline
\end{array}
$$

4

$$
\begin{array}{rl}
 & 24 \longrightarrow 20+4 \\
\times & 129 \longrightarrow 100+20+9 \\
\hline
 & 12000 \leftarrow 20\times 100 \\
 & 400 \leftarrow 4\times 100 \\
 & 400 \leftarrow 20\times 20 \\
 & 80 \leftarrow 4\times 20 \\
 & 180 \leftarrow 20\times 9 \\
+ & 36 \leftarrow 4\times 9 \\
\hline
 & 3096 \\
\hline
\end{array}
$$

5

$$
\begin{array}{rl}
 & 3\ 6 \rightarrow 30+6 \\
\times & 9\ 3 \rightarrow 90+3 \\
\hline
 & 2700 \leftarrow 30\times 90 \\
 & 540 \leftarrow 6\times 90 \\
 & 90 \leftarrow 30\times 3 \\
+ & 18 \leftarrow 6\times 3 \\
\hline
 & 3348
\end{array}
$$

6

$$
\begin{array}{rl}
 & 222 \rightarrow 200+20+2 \\
\times & 58 \rightarrow 50+8 \\
\hline
 & 10000 \leftarrow 200\times 50 \\
 & 1000 \leftarrow 20\times 50 \\
 & 100 \leftarrow 2\times 50 \\
 & 1600 \leftarrow 200\times 8 \\
 & 160 \leftarrow 20\times 8 \\
+ & 16 \leftarrow 2\times 8 \\
\hline
 & 12876
\end{array}
$$

7 Money they make =

Cost of 1 bike x Number of bikes

= 249 x 24

249 → 200 + 40 + 9

x 24 → 20 + 4

14000 ← 200 x 20

8000 ← 40 x 20

1800 ← 9 x 20

8000 ← 200 x 4

160 ← 40 x 4

+ 36 ← 9 x 4

5976

8 Money they make =

Cost of 1 package x Number of scooters

= 367 x 12

367 → 300 + 60 + 7

x 12 → 10 + 2

13000 ← 300 x 10

6000 ← 60 x 10

$$
\begin{array}{rr}
 & 70 \leftarrow 7 \times 10 \\
600 & \leftarrow 300 \times 2 \\
120 & \leftarrow 60 \times 2 \\
+\quad 14 & \leftarrow 7 \times 2 \\
\hline
4404 &
\end{array}
$$

On My Own

MATH REPLAY | GO ONLINE

Name _____

Write the multiplication expression using factors of 10. Then, find the value.

1. 3.6×10^2

2. 7.2×10^3

3. 4.8×10^4

4. 1.9×10^2

5. Ashley rides the train to visit her grandmother. She lives 1.2×10^2 miles away from her grandmother. How many miles does she travel?

6. Juan walks 4.7×10^3 meters from his house to the museum. Mary walks 9.3×10^2 meters from her house to the museum. Who walks farther, Juan or Mary? How do you know?

7. **Error Analysis** Sasha multiplied the decimals as shown. How can you help Sasha understand the patterns in multiplying decimals by powers of 10?

$3.5 \times 10^2 = 3{,}500$
$3.5 \times 10^3 = 35{,}000$
$3.5 \times 10^4 = 350{,}000$

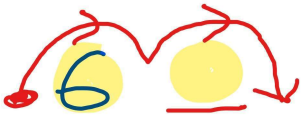
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PAGE - 175

QUESTIONS 1 - 7

1 3.6×10^2

3.6×100 → 2 zero point makes 2 jumps

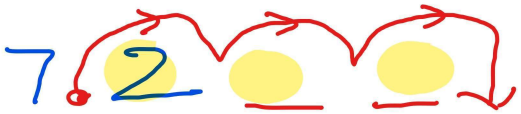


360.

$= 360$

2 7.2×10^3

7.2×1000 → 3 zero point makes 3 jump

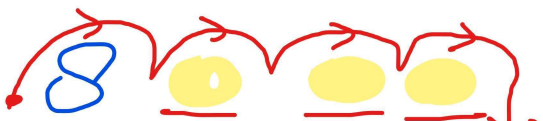


7200.

$= 7200$

3 4.8×10^4

4.8×10000 → 4 zero point makes 4 jump

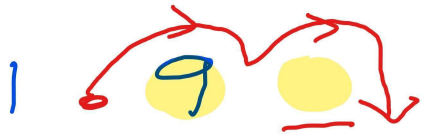


$= 48000.$

$= 48000$

4 1.9×10^2

1.9×100 → 2 zero point makes 2 jump



$190.$

$= 190$

5 1.2×10^2

1.2×100 → 2 zero point makes 2 jumps

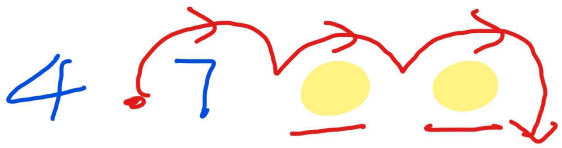


$120.$

$= 120$

6 4.7×10^3

4.7×1000 → 3 zero point makes 3 jumps



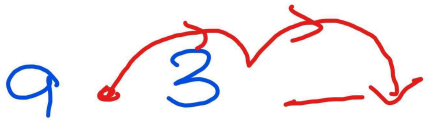
$4700.$

$= 4700$

Now we take

9.3×10^2

9.3×100 → 2 zero point makes 2 jumps



$9\ 3\ 0.$

$= 9\ 3\ 0$

As $4700 > 930$

Juan walked more than Mary

I $3.5 \times 10^2 = 3.5\ 0. = 350.$

$= 350$

$3.5 \times 10^3 = 3.5\ 0\ 0. = 3500.$

$= 3500$

$3.5 \times 10^4 = 3.5\ 0\ 0\ 0. = 35000.$

$= 35000$

Learn

Jonah will make 5 turkey sandwiches. He will use 0.04 pound of lettuce for each sandwich. Lettuce costs $0.90 per pound.

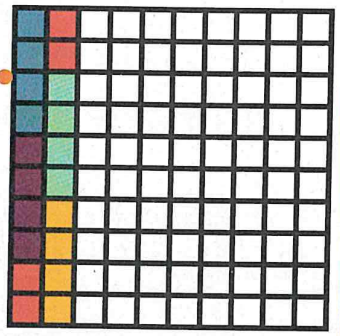
How can you determine the cost of lettuce for all 5 sandwiches?

You can use decimal grids to help you solve the problem.

Find the total amount of lettuce, p.

$5 \times 0.04 = p$

Show 5 groups of 0.04.



There are 20 hundredths of the whole shaded.

Jonah needs 0.2 pound of lettuce to make all 5 sandwiches.

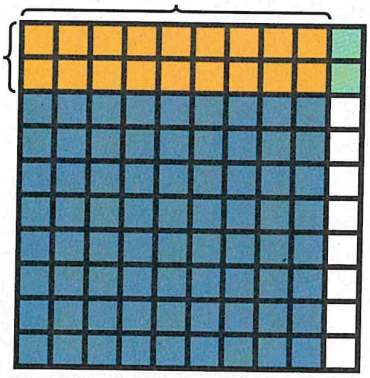
Find the total cost, c.

$0.2 \times 0.9 = c$

There are 18 hundredths of the whole shaded.

Shade 0.9 of the whole.

Shade 0.2 of 0.9.



The cost of lettuce for 5 sandwiches is $0.18.

Math is... Modeling

How do decimal grids help you understand multiplying decimals?

Representations are a helpful tool when solving multiplication problems involving decimals.

Work Together

Rin needs 0.3 cup of flour per serving to make bread. Rin wants to make 4 servings. How many cups of flour does he need?

4×0.3

$= 1.2$ cups of flour

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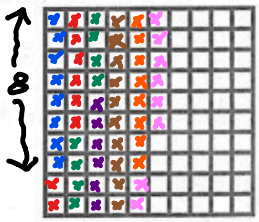
17	Represent Multiplication of Decimals	(1-4)	Page 183

Write an equation and use a decimal grid to help you solve.

1. Laura pours 0.08 liter of milk into her tea each day. How much milk does Laura use in her tea in one week?

7×0.08

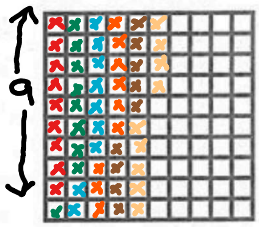
$= 0.56$



2. Jason buys 0.9 pound of cabbage. The grocery store charges $0.60 per pound. How much will Jason pay for the cabbage?

$0.60 = 0.6$

$0.6 \times 0.9 = 0.54$



3. Tonya cuts 0.4 meter of ribbon for each gift she wraps. She wraps 6 gifts. How much ribbon does Tonya use?

$6 \times 0.4 = 2.4$



4. **STEM Connection** A rock has a mass of 2.4 kilograms. Maya estimates that the amount of granite in the rock is 0.3 of the full mass of the rock. How much granite is in the rock?

2.4×0.3

$= 0.72$

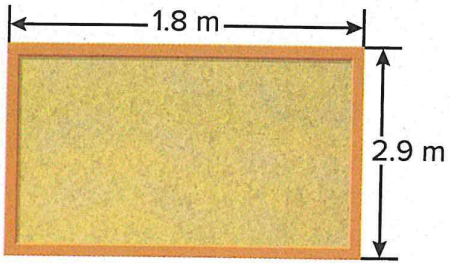


Learn

How can you find the area of the board?

You can use the equation $1.8 \times 2.9 = A$ to represent the problem.

You can use an area model to help you solve the equation.



Decompose each factor and find partial products.

Decompose by place value.

	2	+	0.9
1	$2 \times 1 = 2$		$0.9 \times 1 = 0.9$
+			
0.8	$2 \times 0.8 = 1.6$		$0.9 \times 0.8 = 0.72$

Find partial products by finding the area of each rectangle.

Add partial products.

$2 + 0.9 + 1.6 + 0.72 = 5.22$

The area of the board is 5.22 square meters.

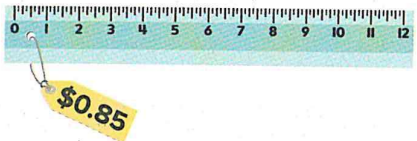
Math is... Modeling

How are the area models for decimals and whole numbers similar?

One multiplication strategy for multiplying decimals is to use an area model to determine partial products, which are then added to determine the product.

Work Together

A teacher bought 18 rulers. What was the total cost of the rulers? Use an area model to solve.



18 × 0.85

	80	+	5
10	10 × 80 = 800		10 × 5 = 50
+			
8	8 × 80 = 640		8 × 5 = 40

$800 + 640 + 50 + 40 = 1530$

$18 \times 85 = 1530$

$18 \times 0.85 = 15.30$

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On My Own

MATH REPLAY | GO ONLINE

Name _____

What is the product? Use an area model to solve.

1. $32 \times 1.5 =$ _____

2. $14 \times 2.3 =$ _____

3. $7.1 \times 8 =$ _____

4. $6.2 \times 1.5 =$ _____

5. $9.6 \times 5.5 =$ _____

6. $1.9 \times 2.4 =$ _____

7. A tent repair shop charges $9.50 for every 1 meter of stitching repaired on a tent. Michael brings in his tent for repairs. It needs 1.2 meters of stitching. How much will the repairs cost him?

8. **Error Analysis** Evelyn used an area model to multiply 7.4×1.2 as shown. How do you respond to her work?

	1	+	2
7	$7 \times 1 = 7$		$7 \times 2 = 14$
+			
4	$4 \times 1 = 4$		$4 \times 2 = 8$

$7 + 14 + 4 + 8 = 33$

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Answers of page 189

1. 32×1.5

$32 = 30 + 2$

$15 = 10 + 5$

	30	+ 2
10	10×30 = 300	10×2 = 20
+ 5	5×30 = 150	5×2 = 10

$300 + 150 + 20 + 10 = 480$

So. $32 \times 15 = 480$

$32 \times 1.5 = 48.0 = 48$

2. 14×2.3

$14 = 10 + 4$

$23 = 20 + 3$

	10	+ 4
20	20×10 = 200	20×4 = 80
+ 3	3×10 = 30	3×4 = 12

$200 + 30 + 80 + 12 = 322$

$14 \times 23 = 322$

$14 \times 2.3 = 32.2$

3. 7.1×8

$71 = 70 + 1$

$8 = 8$

	70	+ 1
8	70×8 = 560	1×8 = 8

$560 + 8 = 568$

$71 \times 8 = 568$

$7.1 \times 8 = 56.8$

4. 6.2×1.5

$62 = 60 + 2$

$15 = 10 + 5$

	60	+ 2
10	10×60 = 600	10×2 = 20
+ 5	60×5 = 300	5×2 = 10

$600 + 300 + 20 + 10 = 930$

$62 \times 15 = 930$

$6.2 \times 1.5 = 9.30$

5. 9.6×5.5

$96 = 90 + 6$

$55 = 50 + 5$

	90	+	6
50	50×90 = 4500		50×6 = 300
+			
5	5×90 = 450		5×6 = 30

$4500 + 450 + 300 + 30 = 5280$

$96 \times 55 = 5280$

$9.6 \times 5.5 = 52.80$

6 1.9×2.4

$19 = 10 + 9$

$24 = 20 + 4$

	10	+	9
20	20×10 = 200		20×9 = 180
+			
4	4×10 = 40		4×9 = 36

$200 + 180 + 44 + 36 = 456$

$19 \times 24 = 456$

$1.9 \times 2.4 = 4.56$

7

$9.50 \times 1.2 = 9.5 \times 1.2$

$95 = 90 + 5$

$12 = 10 + 2$

	90	+ 5
10	90×10 900	10×5 50
+ 2	2×90 180	2×5 10

$900 + 180 + 50 + 10 = 1140$

$95 \times 12 = 1140$

$9.5 \times 1.2 = 11.40$

8

7.4×1.2

$74 = 70 + 4$

$12 = 10 + 2$

	70	+ 4
10	10×70 700	10×4 40
+ 2	70×2 140	2×4 8

$700 + 140 + 40 + 8 = 888$

$74 \times 12 = 888$

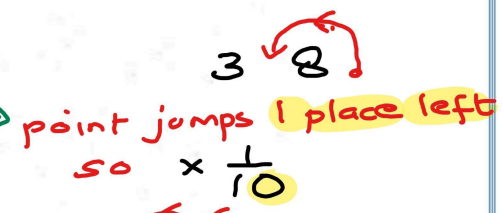
$7.4 \times 1.2 = 8.88$

5	Generalizations About Multiplying Decimals	(1-11) & 7	Page 193

Complete each sentence.

1. 3.8 is $\frac{1}{10}$ of 38.

   So, 3.8 × 25 is $\frac{1}{10}$ of the product 38 × 25.



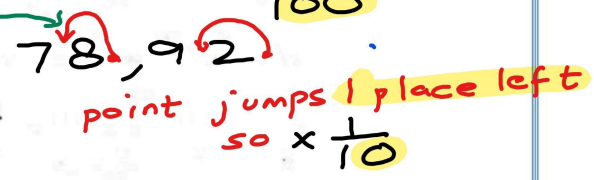
2. 0.45 is $\frac{1}{100}$ of 45.

   So, 0.45 × 16 is $\frac{1}{100}$ of the product 45 × 16.



3. 7.8 is $\frac{1}{10}$ of 78 and 9.2 is $\frac{1}{10}$ of 92.

   So, 7.8 × 9.2 is $\frac{1}{100}$ of the product 78 × 92.



What is the product? Use patterns to solve.

4. 45 × 17 = 765

   45 × 1.7 = 76.5

   45 × 0.17 = 7.65

5. 32 × 14 = 448

   32 × 1.4 = 44.8

   3.2 × 1.4 = 4.48

6. 16 × 89 = 1,424

   16 × 8.9 = 142.4

   16 × 0.89 = 14.24

7. 61 × 22 = 1342

   6.1 × 22 = 134.2

   6.1 × 2.2 = 13.42

8. 96 × 55 = 5280

   96 × 5.5 = 528.0

   9.6 × 5.5 = 52.8

9. 19 × 42 = 798

   1.9 × 42 = 79.8

   1.9 × 4.2 = 7.98

10. 67 × 34 = 2278

    67 × 3.4 = 227.8

    6.7 × 3.4 = 22.78

11. 82 × 67 = 5494

    82 × 6.7 = 549.4

    8.2 × 6.7 = 54.94

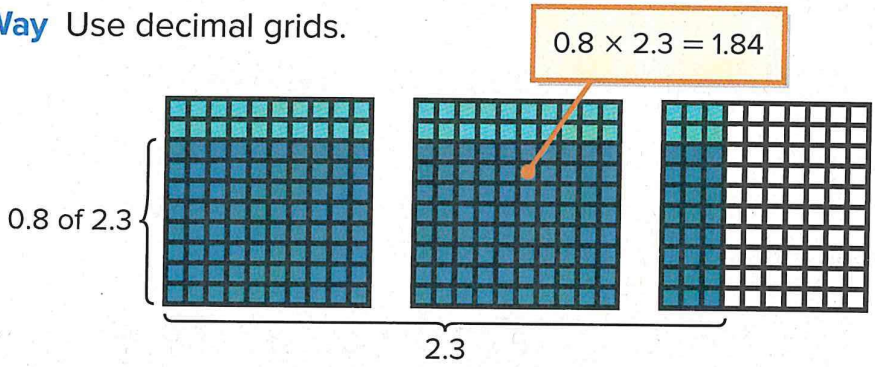
Learn

Amy rides her bike 2.3 miles to school each day. Jason rides his bike 0.8 of that distance.



How far does Jason ride his bike to school each day?

One Way Use decimal grids.



Jason rides his bike 1.84 miles to school each day.

Another Way Use partial products.

$0.8 \times 2.3 = 0.8 \times (2 + 0.3)$ — Decompose 2.3 by place value.

$= 0.8 \times 2 + 0.8 \times 0.3$

$= 1.6 + 0.24$ — Add partial products.

$= 1.84$

Jason rides his bike 1.84 miles to school each day.

Math is... Exploring

Why is it useful to know more than one strategy to solve a problem?

You can use any strategy to multiply decimals. Look at the factors to determine the most efficient strategy.

Work Together

An area model can be used to solve 3.6×2.5.

What other strategy can you use to solve this problem?

partial products

	2	+	0.5
3	$3 \times 2 = 6$		$3 \times 0.5 = 1.5$
+			
0.6	$0.6 \times 2 = 1.2$		$0.6 \times 0.5 = 0.30$

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On My Own

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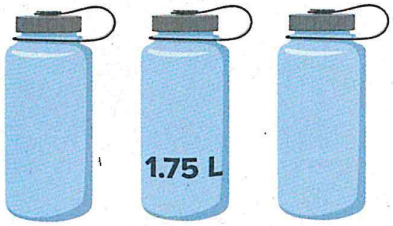
Name _____

What is the product? Explain the strategy you used to solve.

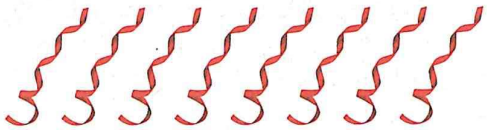
1. $2.9 \times 0.7 = d$

2. $5.6 \times 3.2 = b$

3. Each bottle holds the same amount. How much water can these bottles hold?



4. Rebecca cut these ribbons to the same length. How much ribbon did Rebecca use in all?



5. Experts recommend that people have 4.7 grams of potassium per day. Last week Marcus averaged 0.9 times as much potassium as the recommendation. How much potassium did Marcus average each day last week?

6. A pitcher has a capacity of 3.9 liters. A cooler has a capacity 9.2 times greater. What is the capacity of the cooler?

Solve. Explain the strategy used to solve.

7. Kara has a bag of apples. Each apple weighs 0.4 pound on average. There are 17 apples in her bag. What is the total weight of her apples?

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PAGE – 197

QUESTIONS 1 – 7

1

$$\begin{array}{r} 2\ 9 \\ \times\quad 7 \\ \hline 6\ 3 \\ +\ 1\ 4\ \ \\ \hline 2\ 0\ 3 \end{array}$$

2.9×0.7

$= 2.03$

2

$$\begin{array}{r} 5\ 6 \\ \times\ 3\ 2 \\ \hline 1\ 2 \\ 1\ 0\ \ \\ 1\ 8\ \ \\ +\ 1\ 5\ \ \ \\ \hline 1\ 7\ 9\ 2 \end{array}$$

5.6×3.2

$= 17.92$

3

$$\begin{array}{r} 1\ 7\ 5 \\ \times\ \ 3 \\ \hline 1\ 5 \\ 2\ 1\ \ \\ 3\ \ \ \\ \hline 5\ 2\ 5 \end{array}$$

1.75×3

$= 5.25$

4 Ribbons = 8

length of each ribbon = 0.86

Total length = $8 \times 0.86 = 6.88$

$$\begin{array}{r} 8\ 6 \\ \times\ 8 \\ \hline 4\ 8 \\ +\ 6\ 4 \\ \hline 6\ 8\ 8 \end{array}$$

5 Marcus average = 4.7×0.9

$= 4.23$

$$\begin{array}{r} 4\ 7 \\ \times\ \ 9 \\ \hline 6\ 3 \\ +\ 3\ 6 \\ \hline 4\ 2\ 3 \end{array}$$

6 Capacity of cooler = 3.9×9.2

$= 35.88$

$$\begin{array}{r} 3\ 9 \\ \times\ 9\ 2 \\ \hline 1\ 8 \\ 0\ 6 \\ 8\ 1 \\ +\ 2\ 7 \\ \hline 3\ 5\ 8\ 8 \end{array}$$

7 Total weight of apples = 17 x 0.4

= 6.8 pound

$$\begin{array}{r} 17 \\ \times\ 4 \\ \hline 28 \\ 4 \\ \hline 68 \end{array}$$

Learn

There are 12,000 nickels.

How can you find the number of rolls of nickels?



Patterns can help you solve the problem.

$12{,}000 \div 40 = n$

You can use a basic fact and patterns to help you solve the equation.

basic fact → $12 \div 4 = 3$

$120 \div 40 = 3$

Both the dividend and divisor are 10 times as much, so quotient is the same.

When only the dividend is 10 times as much, the quotient is also 10 times as much.

$120 \div 40 = 3$

$1{,}200 \div 40 = 30$

$12{,}000 \div 40 = 300$

As the number of zeros in the dividend increases, the number of zeros in the quotient also increases.

There are 300 rolls of nickels.

Math is... Structure

How can you use place value to explain this pattern?

You can use patterns in the number of zeros to help you divide by a multiple of 10.

Work Together

What is the quotient? How can you use a basic fact and patterns to solve?

$300 \div 50 = 6$

$3{,}000 \div 50 = 60$

$30{,}000 \div 50 = 600$

$300 \div 50 = 6$

$3000 \div 50 = 60$

$30000 \div 50 = 600$

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Name _____

Use a basic fact and patterns to solve.

1. 15 ÷ _____ = 5

   150 ÷ 30 = _____

   _____ ÷ 30 = 50

   15,000 ÷ _____ = _____

2. 32 ÷ 8 = _____

   _____ ÷ 80 = _____

   3,200 ÷ _____ = _____

   _____ ÷ _____ = _____

3. 20,000 ÷ 40 = _____

4. 15,000 ÷ 30 = _____

5. 18,000 ÷ 60 = _____

6. 16,000 ÷ 80 = _____

7. 8,000 ÷ 40 = _____

8. 25,000 ÷ 50 = _____

9. 32,000 ÷ 80 = _____

10. 9,000 ÷ 30 = _____

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PAGE - 209

QUESTIONS 1 - 10

1 $15 \div 3 = 5$

$150 \div 30 = 5$ ⟶ $15\not{0} \div 3\not{0} = 5$

$1500 \div 30 = 50$ ⟶ $150\not{0} \div 3\not{0} = 50$

$15000 \div 300 = 50$ ⟶ $150\not{0}\not{0} \div 3\not{0}\not{0} = 50$

2 $32 \div 8 = 4$

$320 \div 80 = 4$ ⟶ $32\not{0} \div 8\not{0} = 4$

$3200 \div 800 = 4$ ⟶ $32\not{0}\not{0} \div 8\not{0}\not{0} = 4$

$32000 \div 8000 = 4$ ⟶ $32\not{0}\not{0}\not{0} \div 8\not{0}\not{0}\not{0} = 4$

3 $20000 \div 40$

$2000\not{0} \div 4\not{0} = 500$

(×5)

4 $15000 \div 30$

$1500\not{0} \div 3\not{0} = 500$

(×5)

5 $18000 \div 60$

$1800\not{0} \div 6\not{0} = 300$

(×3)

6 $16000 \div 80$

$160\cancel{00} \div 8\cancel{0} = 200$

$\times 2$

7 $8000 \div 40$

$800\cancel{0} \div 4\cancel{0} = 200$

$\times 2$

8 $25000 \div 50$

$2500\cancel{0} \div 5\cancel{0} = 500$

$\times 5$

9 $32000 \div 80$

$3200\cancel{0} \div 8\cancel{0} = 400$

$\times 4$

10 $9000 \div 30$

$900\cancel{0} \div 3\cancel{0} = 300$

$\times 3$

Learn

An adult bison weighs 1,752 pounds, which is 24 times the weight of a bison calf.



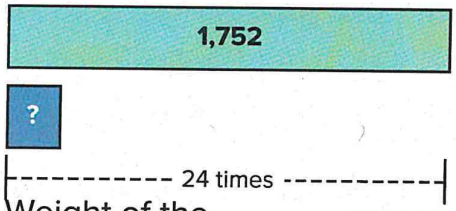
How much does the bison calf weigh?

You can use partial quotients to solve division equations.

A bar diagram can represent the problem.

$1{,}752 \div 24 = l$.

Weight of the adult bison



Math is... Connections

What is another way to show multiplicative comparison?

Use partial quotients to solve.

$$
\begin{array}{r|l}
24\overline{)1{,}752} & \\
-1{,}200 & 50 \\
\hline
552 & \\
-480 & 20 \\
\hline
72 & \\
-72 & 3 \\
\hline
0 & 73
\end{array}
$$

$1{,}752 \div 24 = 73$

The bison calf weighs 73 pounds.

Work Together

What is the quotient of $2{,}356 \div 38$? Use the partial quotients strategy to help you solve the problem.

38

$50 \times 38 = 1{,}900$	50
$10 \times 38 = 380$	10
$2 \times 38 = 76$	2
	62

$$
\begin{array}{r|l}
38\overline{)2{,}356} & \\
-1900 & 50 \\
\hline
456 & \\
-380 & 10 \\
\hline
76 & \\
-76 & 2 \\
\hline
0 & 62
\end{array}
$$

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Name _____

What is the quotient? Use partial quotients to solve.

1. 819 ÷ 39 = ____

2. 988 ÷ 26 = ____

3. 1,215 ÷ 27 = ____

4. 3,432 ÷ 66 = ____

5. **STEM Connection** An astronomer is studying two comets. Comet A has an orbit that is 187 years. Comet A has an orbit that is 17 times as long as the Comet B. How long is the orbit of the Comet B?



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Page 225, Answers

1. $819 \div 39 = 21$

39	819	
	−390	10
	429	
	−390	10
	39	
	−39	+1
	00	21

$39 \times 1 = 39$ (+39)
$39 \times 2 = 78$ (+39)
$39 \times 3 = 117$ (+39)
$39 \times 4 = 156$
$39 \times 10 = 390$

2. $988 \div 26 = 38$

26	988	
	−260	10
	728	
	−260	10
	468	
	−260	10
	208	
	−104	4
	104	
	−104	+4
	000	38

$26 \times 1 = 26$ (+26)
$26 \times 2 = 52$ (+26)
$26 \times 3 = 78$ (+26)
$26 \times 4 = 104$
$26 \times 10 = 260$

3. $1215 \div 27 = 45$

$27 \times 1 = 27$
$27 \times 2 = 54$ (+27)
$27 \times 3 = 81$ (+27)
$27 \times 4 = 108$ (+27)
$27 \times 10 = 270$

$27 \times 20 = 540$
$27 \times 30 = 810$
$27 \times 40 = 1080$
$27 \times 100 = 2700$

27	1215	
	−1080	40
	135	
	−108	4
	27	
	−27	+1
	00	45

4. $3432 \div 66 = 52$

$66 \times 1 = 66$
$66 \times 2 = 132$ (+66)
$66 \times 3 = 198$ (+66)
$66 \times 4 = 264$ (+66)
$66 \times 10 = 660$

$66 \times 2 = 1320$
$66 \times 30 = 1980$
$66 \times 40 = 2640$
$66 \times 100 = 6600$

66	3432	
	−2640	40
	792	
	−660	10
	132	
	−66	1
	66	
	−66	+1
	00	52

5. Orbit of Comet B is

$187 \div 17$

17	187	
	−170	10
	17	
	−17	+1
	00	11

$17 \times 1 = 17$

$17 \times 2 = 34$ (+17)

$17 \times 3 = 51$ (+17)

$17 \times 4 = 68$ (+17)

$17 \times 10 = 170$

Orbit of Comit B is 11 years