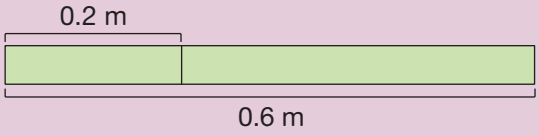
Use Place-Value Thinking to Divide Decimals by Decimals

14.5

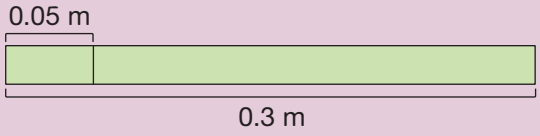
Ex. Chris has a board that is 0.6 m long. He cuts the board into pieces that are each 0.2 m long. How many pieces does he make?



6 tenths ÷ 2 tenths = 3

0.6 ÷ 0.2 = **3**

Ex. Sienna has a piece of wire that is 0.3 m long. She cuts the wire into pieces that are each 0.05 m long. How many pieces does she make?



30 hundredths ÷ 5 hundredths = 6

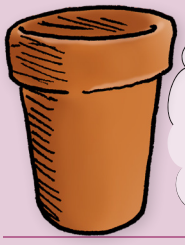
0.3 ÷ 0.05 = **6**

Divide Decimals by Decimals with Long Division

1. Move the divisor's decimal point to the right. Move the decimal point as many places as you need to make the divisor a whole number. Mark the new position with a caret (^).
2. Move the dividend's decimal point the same number of places to the right. Mark the new position with a caret (^).
3. Divide like usual. Ignore any leading zeros.
4. Place the decimal point in the quotient directly above its new place in the dividend.

14.6

Ex. Alexandra has 4.2 cubic feet of potting soil. Each flower pot holds 0.3 cubic feet of soil. How many flower pots can she fill?



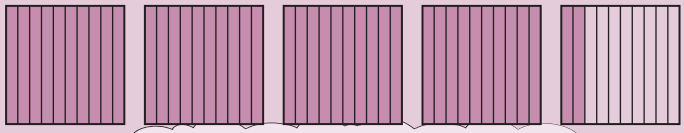
0.3 = 3 tenths

4.2 = 42 tenths

$$0.3\overline{)4.2} \rightarrow 0.3\overline{)4.2}$$

$$\begin{array}{r} 14. \\ 0.3\overline{)4.2} \\ -3\phantocm \\ \hline 12 \\ -12 \\ \hline 0 \end{array}$$

She can fill **14 pots.**



42 tenths ÷ 3 tenths = 14

Unit 14 Reference Page

Tack on Zeros to Divide Decimals

14.7

Sometimes, you need to fill in zeros as you move the decimal point.
After you move the decimal point, tack on trailing zeros in the dividend to match the number of decimal digits you want in the answer.

Ex. Prue has 1.1 kg of sugar. She needs 0.25 kg for each batch of brownies. How many batches of brownies can she make? Write your answer with one decimal digit.

$0.25\overline{)1.10} \rightarrow 0.25\overline{)1.100}$

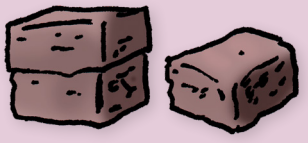
4.4 kg

-100

100

-100

0



Ex. Paul has 1.74 kg of flour. He needs 0.4 kg for each batch of cookies. How many batches of cookies can he make? Write your answer with two decimal digits.

$0.4\overline{)1.74} \rightarrow 0.4\overline{)1.740}$

4.35 kg

-16

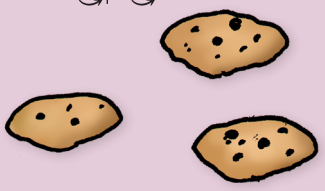
14

-12

20

-20

0



Round Quotients to a Given Number of Decimal Digits

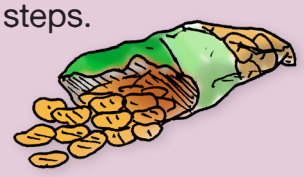
14.8

Ex. The bag of chips weighs 6.3 ounces. Each serving is 0.8 ounces. How many servings are in the bag? Write your answer with 1 decimal digit.

1. Set up the problem and move the decimal point. Tack on trailing zeros to match the number of decimal digits you want in the answer.

$0.8\overline{)6.30}$

2. Follow the long division steps.



78

$0.8\overline{)6.30}$

-56

70

-64

6

3. If there is a remainder, tack on 1 more zero and follow the long division steps again. Round your answer to the correct number of decimal digits.

7.87

$0.8\overline{)6.300}$

-56

70

-64

60

$7.87 \approx$ **7.9 servings**

Use a Calculator to Solve Rate Problems

14.9

Ex. The butcher charges $6.39 for 0.8 pounds of chicken. What is the unit price per pound? Write your answer with 2 decimal digits.

$\frac{6.39 \text{ dollars}}{0.8 \text{ lb.}} \rightarrow$ 7.9875

$7.9875 \approx$ **$7.99 per pound**

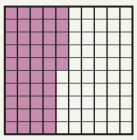
Ex. How much does 1.35 pounds of chicken cost? Write your answer with 2 decimal digits.

$7.99 \frac{\text{dollars}}{\text{lb.}} \times 1.34 \text{ lb.} \rightarrow$ 10.7066

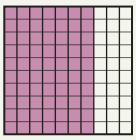
$10.7066 \approx$ **$10.71 per pound**

Lesson Activities

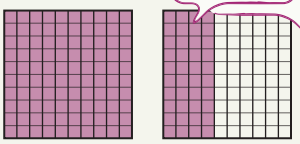
A



0.45 = _____ hundredths



0.7 = _____ hundredths

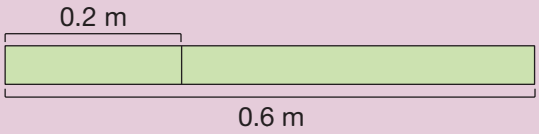


1.4 = _____ tenths

B

Use Place-Value Thinking to Divide Decimals by Decimals

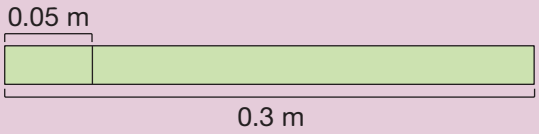
Ex. Chris has a board that is 0.6 m long. He cuts the board into pieces that are each 0.2 m long. How many pieces does he make?



6 tenths ÷ 2 tenths = 3

0.6 ÷ 0.2 = **3**

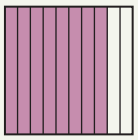
Ex. Sienna has a piece of wire that is 0.3 m long. She cuts the wire into pieces that are each 0.05 m long. How many pieces does she make?



30 hundredths ÷ 5 hundredths = 6

0.3 ÷ 0.05 = **6**

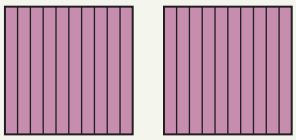
Sam has 0.8 kg of clay. He splits the clay into balls that each weigh 0.2 kg. How many balls of clay does he make?



____ tenths ÷ ____ tenths = ____

0.8 ÷ 0.2 = _____

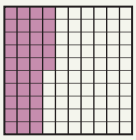
Eliza has 2 L of grape juice. She pours 0.4 L into each glass. How many glasses does she pour?



____ tenths ÷ ____ tenths = ____

2 ÷ 0.4 = _____

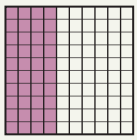
Each piece of candy costs $0.05. How many pieces of candy can you buy for $0.35?



____ hundredths ÷ ____ hundredths = ____

0.35 ÷ 0.05 = _____

Cassie has 0.4 m of yarn. She splits the yarn into pieces that are each 0.08 m long. How many pieces does she make?

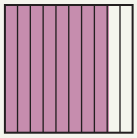


____ hundredths ÷ ____ hundredths = ____

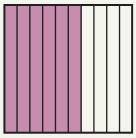
0.4 ÷ 0.08 = _____

Practice

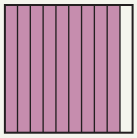
Find the quotient.



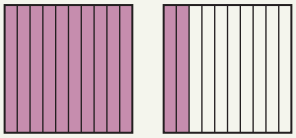
0.8 ÷ 0.4 = _____



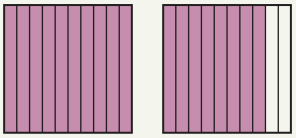
0.6 ÷ 0.1 = _____



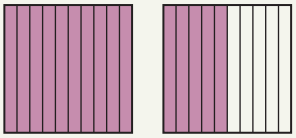
0.9 ÷ 0.3 = _____



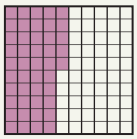
1.2 ÷ 0.3 = _____



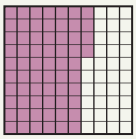
1.8 ÷ 0.2 = _____



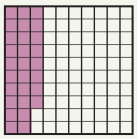
1.5 ÷ 0.5 = _____



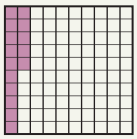
0.45 ÷ 0.09 = _____



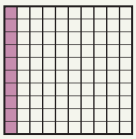
0.64 ÷ 0.08 = _____



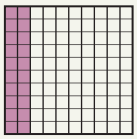
0.28 ÷ 0.04 = _____



0.15 ÷ 0.01 = _____



0.1 ÷ 0.05 = _____



0.2 ÷ 0.05 = _____

Find the quotient.

0.7 ÷ 0.7 = _____

1.4 ÷ 0.7 = _____

2.1 ÷ 0.7 = _____

0.12 ÷ 0.06 = _____

0.18 ÷ 0.06 = _____

0.24 ÷ 0.06 = _____

1 ÷ 0.5 = _____

2 ÷ 0.5 = _____

3 ÷ 0.5 = _____

Solve. Write the equations you use.

Rachel makes 3.2 lb. of pizza dough. She divides the dough into balls that each weigh 0.8 lb. How many balls of dough does she make?

The restaurant has 4.8 L of iced tea. The waiter pours 0.6 L into each customer's glass. How many glasses can he fill?

Review

Write a number that matches each description. (Many answers are possible.)

Has 3 decimal digits and 2 leading zeros.

Has 4 decimal digits and 1 trailing zero.

Has 2 leading zeros and 1 trailing zero.

Use long division to find the unit price of each item. Write your answers with 2 decimal digits.

Solve. Write the equations you use. Write your answers with 2 decimal digits.

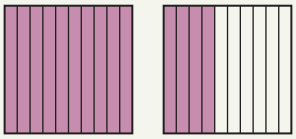
Lucinda earns $135 in April. She saves 40% of her earnings. How much money does she save?

Lucinda gives away 15% of her earnings. How much money does she give away?

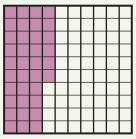
Lucinda spends the rest of her money. How much does she spend?

Lesson Activities

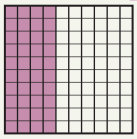
A



1.4 ÷ 0.7 = _____



0.36 ÷ 0.06 = _____



0.4 ÷ 0.04 = _____

B

Divide Decimals by Decimals with Long Division

1. Move the divisor's decimal point to the right. Move the decimal point as many places as you need to make the divisor a whole number. Mark the new position with a caret (^).
2. Move the dividend's decimal point the same number of places to the right. Mark the new position with a caret (^).
3. Divide like usual. Ignore any leading zeros.
4. Place the decimal point in the quotient directly above its new place in the dividend.

Ex. Alexandra has 4.2 cubic feet of potting soil. Each flower pot holds 0.3 cubic feet of soil. How many flower pots can she fill?

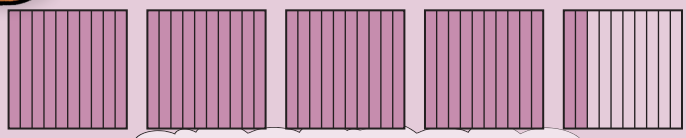
$0.3\overline{)4.2}$ → $0.3\overline{)4.2}$ → $0.3\overline{)4.2}$

$$\begin{array}{r} 14. \\ 0.3\overline{)4.2} \\ -3 \\ \hline 12 \\ -12 \\ \hline 0 \end{array}$$

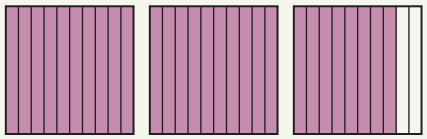
0.3 = 3 tenths

4.2 = 42 tenths

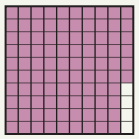
She can fill **14 pots.**



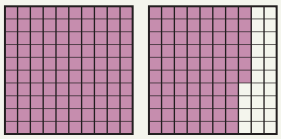
42 tenths ÷ 3 tenths = 14



$0.2\overline{)2.8}$



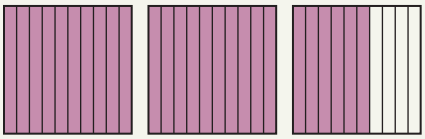
$0.06\overline{)0.96}$



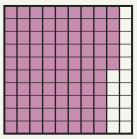
$0.08\overline{)1.76}$

Practice

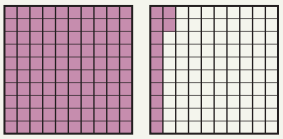
Use long division to solve.



0.2) 2.6



0.05) 0.85



0.07) 1.12

Use long division to solve. Use the multiplication table to help.

0.25) 3.75

0.25) 8.00

0.25) 9.25

	× 25
1	25
2	50
3	75
4	100
5	125
6	150
7	175
8	200
9	225

Solve. Use the completed problems above to find the answers.

The scientist makes 0.85 L of a chemical solution. He pours 0.05 L into each test tube. How many test tubes does he fill?

1 quarter is worth $0.25. How many quarters are in $9.25?

Each lap around the track is 0.25 miles long. How many laps do you have to run to run a total of 3.75 miles?

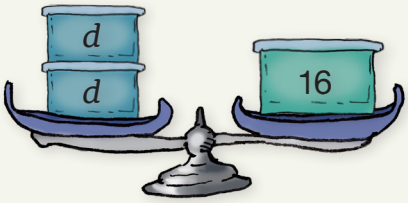
Tim buys 2.6 pounds of coffee beans. He uses 0.2 pounds per day. How many days will the coffee beans last?

Review

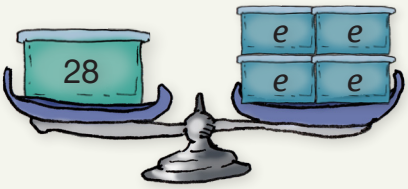
Complete the chart to show three ways to write each division problem. You do not need to find the quotients.

Division Bracket	$7\overline{)13.2}$			$0.12\overline{)0.4}$
Division Symbol			$0.95 \div 0.03$	
Fraction Bar		$\frac{1.7}{0.6}$		

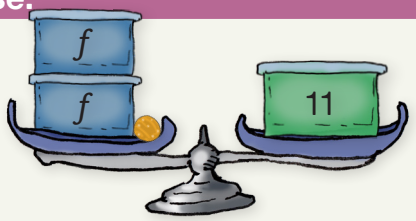
Find the value of the variable. Write the equations you use.



$2d = 16$

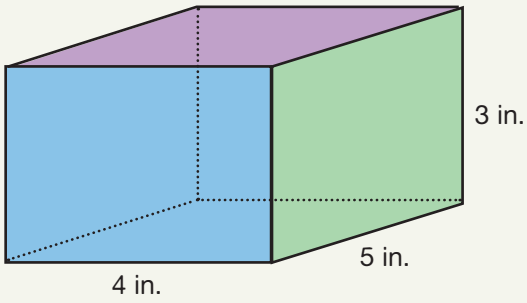


$28 = 4e$



★ $2f + 1 = 11$

Find the surface area. Write the equations you use.



Surface area: _____

Use mental math to complete.

100% of 15 = _____

$133\frac{1}{3}$% of 15 = _____

$166\frac{2}{3}$% of 15 = _____

200% of 15 = _____

100% of 35 = _____

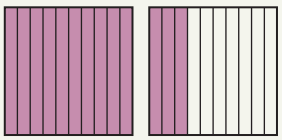
200% of 35 = _____

300% of 35 = _____

400% of 35 = _____

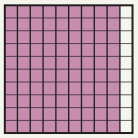
Lesson Activities

A



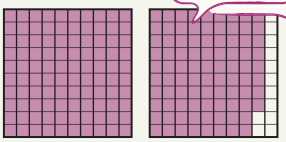
1.3 ÷ 0.5

1	3	5



0.9 ÷ 0.12

4	6	8



1.88 ÷ 0.8

1	2	3

B

Tack on Zeros to Divide Decimals

Sometimes, you need to fill in zeros as you move the decimal point.
After you move the decimal point, tack on trailing zeros in the dividend to match the number of decimal digits you want in the answer.

Ex. Prue has 1.1 kg of sugar. She needs 0.25 kg for each batch of brownies. How many batches of brownies can she make? Write your answer with one decimal digit.

$0.25\overline{)1.10} \longrightarrow 0.25\overline{)1.100}$

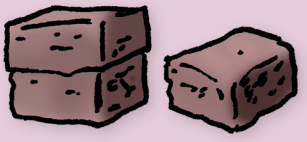
4.4 kg

-100

100

-100

0



Ex. Paul has 1.74 kg of flour. He needs 0.4 kg for each batch of cookies. How many batches of cookies can he make? Write your answer with two decimal digits.

$0.4\overline{)1.74} \longrightarrow 0.4\overline{)1.740}$

4.35 kg

-16

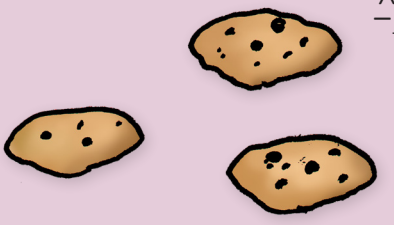
14

-12

20

-20

0

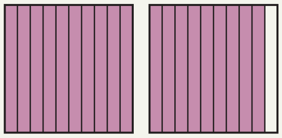


1 decimal digit	2 decimal digits	1 decimal digit
$0.5\overline{)3.9}$	$0.8\overline{)1.88}$	$0.12\overline{)0.9}$

	× 12
1	12
2	24
3	36
4	48
5	60
6	72
7	84
8	96
9	108

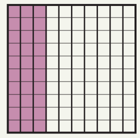
Practice

Circle the best estimate for each division problem.



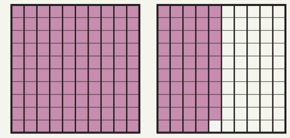
1.9 ÷ 0.5

4 | 6 | 8



0.3 ÷ 0.04

4 | 7 | 10



1.49 ÷ 0.3

5 | 6 | 7

Write the decimal point in the correct place in these quotients.

```
      7 5
0.6 ) 4.5 0
    - 4 2 ↓
        3 0
      - 3 0
          0
```

```
            8 7 5
0.0 8 ) 0.7 0 0 0
      -   6 4 ↓
            6 0
          - 5 6 ↓
              4 0
            - 4 0
                0
```

```
              3 2
0.4 5 ) 1.4 4 0
      - 1 3 5 ↓
            9 0
          - 9 0
              0
```

Use long division to solve. Write your answers with the number of decimal digits listed. Use the multiplication table to help with the final problem.

1 decimal digit

0.5) 1.7

1 decimal digit

0.0 6) 3.3

2 decimal digits

0.3 2) 1.6 8

	× 32
1	32
2	64
3	96
4	128
5	160
6	192
7	224
8	256
9	288

Review

Use mental math to complete.

50	increase by 10%	_____	125	increase by 100%	_____
50	decrease by 10%	_____	125	decrease by 100%	_____
45	increase by 10%	_____	45	increase by 20%	_____
45	decrease by 10%	_____	45	decrease by 20%	_____

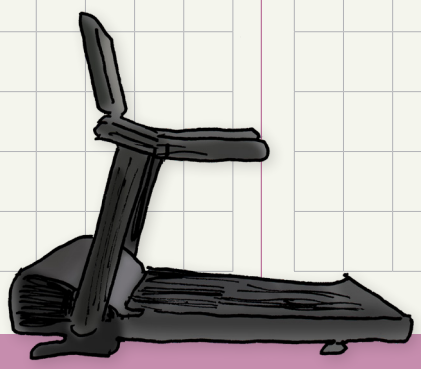
Write each group of numbers in order from least to greatest.

1	−3	−6	2	0.236	0.2365	0.237	0.2307
_____	_____	_____	_____	_____	_____	_____	_____
least			greatest	least			greatest
0.45	$\frac{1}{2}$	0.501	$\frac{2}{5}$	0.84	$\frac{3}{4}$	0.79	$\frac{4}{5}$
_____	_____	_____	_____	_____	_____	_____	_____
least			greatest	least			greatest

Solve. Write the equations you use.

Kylie runs on the treadmill at a speed of 6.7 miles per hour for 0.5 hours. How far does she run? Write your answer with 2 decimal digits.

The box is $2\frac{1}{2}$ feet long, $\frac{1}{2}$ ft. wide, and $\frac{1}{3}$ ft. high. What is the volume of the box in cubic feet?



Lesson Activities

A

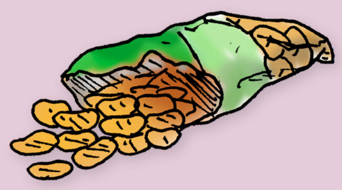
1.385 ≈ ____________   0.763 ≈ ____________   16.499 ≈ ____________

B

Round Quotients to a Given Number of Decimal Digits

Ex. The bag of chips weighs 6.3 ounces. Each serving is 0.8 ounces. How many servings are in the bag? Write your answer with 1 decimal digit.

1. Set up the problem and move the decimal point. Tack on trailing zeros to match the number of decimal digits you want in the answer.
2. Follow the long division steps.
3. If there is a remainder, tack on 1 more zero and follow the long division steps again. Round your answer to the correct number of decimal digits.



0.8⟌6.30 →

```
     78
0.8⟌6.30
   –5 6
     70
    –64
      6
```

→

```
    7.87
0.8⟌6.300
   –5 6
     70
    –64
     60
```

7.87 ≈ **7.9 servings**

The ice cream container weighs 0.84 kg. Each serving of ice cream weighs 0.09 kg. How many servings are in the container? Write your answer with 1 decimal digit.

One bottle of soda holds 2 liters. Each serving is 0.22 liters. How many servings are in the bottle? Write your answer with 1 decimal digit.

	× 22
1	22
2	44
3	66
4	88
5	110
6	132
7	154
8	176
9	198

Practice

Use long division to find the quotients. Write your answers with the given number of decimal digits. Use the multiplication table at the bottom of the page to help with the last problem.

1.4 ÷ 0.3 = _____

3 decimal digits

5.1 ÷ 0.28 = _____

3 decimal digits

Use the recipe to answer the questions. Write your answer with 1 decimal digit. Use the multiplication tables to help.

Play Dough Recipe

- 0.24 kg flour
- 0.28 kg salt
- 0.25 L water

Combine the salt and flour. Gradually stir in the water. Knead for 9 minutes or until the dough is smooth and firm.

The bag of flour weighs 2.3 kg. How many batches of play dough can you make with one bag of flour?

The box of salt weighs 0.74 kg. How many batches of play dough can you make with one box of salt?

	1	2	3	4	5	6	7	8	9
× 24	24	48	72	96	120	144	168	192	216

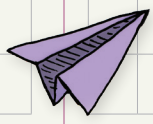
	1	2	3	4	5	6	7	8	9
× 28	28	56	84	112	140	168	196	224	252

Review

Find the unit rates. Make sure to include the correct units in your answer.

Jude can mow 3 lawns in 2 hours. How many lawns does he mow per hour?

Mimi makes 8 paper airplanes in 4 minutes. How many paper airplanes does she make per minute?



Ollie runs 5 laps in 9 minutes. How many laps does he run per minute?

10 ounces of pretzels cost $2.63. What is the unit cost per ounce? Write your answer with 2 decimal digits.

Find the product. Use cancelling where possible. Write your answers in simplest form. Convert improper fractions to mixed numbers.

$\frac{9}{8} \times \frac{5}{3} \times \frac{4}{5} =$

$\frac{2}{7} \times \frac{14}{5} \times \frac{10}{1} =$

$\frac{3}{4} \times \frac{4}{3} \times \frac{7}{8} =$

Use mental math to solve.

3.458 + 1 = _____

3.458 + 0.1 = _____

3.458 + 0.01 = _____

2.793 – 0.1 = _____

2.793 – 0.01 = _____

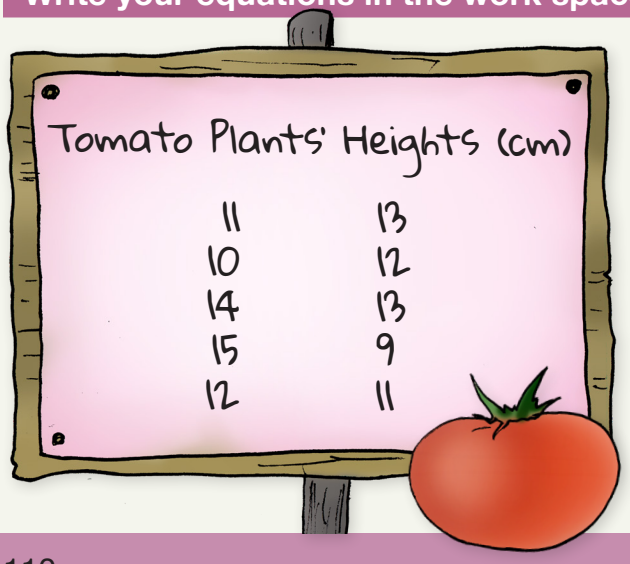
2.793 – 0.001 = _____

4 – 0.1 = _____

4 – 0.01 = _____

4 – 0.001 = _____

Find the mean and median of the tomato plants' heights. Write your equations in the work space.



Mean: _____ Median: _____

Lesson Activities

A

1.74 ÷ 0.31 = _____	2.5 ÷ 1.08 = _____	0.84 ÷ 0.029 = _____
1 decimal digit	2 decimal digits	3 decimal digits

B

Use a Calculator to Solve Rate Problems

Ex. The butcher charges $6.39 for 0.8 pounds of chicken. What is the unit price per pound? Write your answer with 2 decimal digits.

$\frac{6.39 \text{ dollars}}{0.8 \text{ lb.}}$ → 7.9875

7.9875 ≈ **$7.99 per pound**

Ex. How much does 1.35 pounds of chicken cost? Write your answer with 2 decimal digits.

$7.99 \frac{\text{dollars}}{\text{lb.}} \times 1.34 \text{ lb.}$ → 10.7066

10.7066 ≈ **$10.71 per pound**

Andy uses a hose to fill a bucket with a capacity of 7.8 liters. It takes hiim 0.5 minutes. What is the flow rate in liters per minute? Write your answer with 1 decimal digit.

Andy uses to hose to water the flowers for 13.25 minutes. How much water does he use? Write your answer with 1 decimal digit.

How long does it take Andy to fill a bucket with a capacity of 5.2 liters? Write your answer with 1 decimal digit.

The banana slug moves 15.24 centimeters in 1.75 hours. What is the banana slug's speed in centimeters per hour? Write your answer with 2 decimal digits.

How far can the banana slug travel in 0.25 hours? Write your answer with 2 decimal digits.

How long does it take the banana slug to travel 100 centimeters? Write your answer with 2 decimal digits.

Practice

Use a calculator to find the quotient. Write your answers with the given number of decimal digits.

6.43 ÷ 1.98 = _____	0.867 ÷ 0.041 = _____	1.65 ÷ 1.45 = _____
2 decimal digits	3 decimal digits	2 decimal digits
10 ÷ 4.8 = _____	5.51 ÷ 1.49 = _____	26 ÷ 3.05 = _____
2 decimal digits	2 decimal digits	1 decimal digit

Use a calculator to answer the questions. Write the equations you use.

Gas costs $4.739 per gallon. How much does 12.4 gallons cost? Write your answer with 2 decimal digits.

Gas costs $4.739 per gallon. Ben pays $40.00 for gas. How many gallons does he buy? Write your answer with 1 decimal digit.

At the 2022 Winter Olympics, the men's downhill ski course was 3,152 meters long. The gold medalist completed the course in 102.69 seconds. What was his speed (in meters per second)? Write your answer with 1 decimal digit.

At the 2022 Winter Olympics, the women's downhill ski course was 2,704 meters long. The gold medalist skiied the course at an average speed of 29.43 meters per second. How many seconds did it take her to complete the course? Write your answer with 1 decimal digit.

At the bank, the exchange rate is 1.274 British pounds per American dollar. Alistair exchanges 125 American dollars for pounds. How many pounds does he get? Write your answer with 2 decimal digits.

At the bank, the exchange rate is 1.274 British pounds per American dollar. Gabby exchanges 250 British pounds for American dollars. How many dollars does she get? Write your answer with 2 decimal digits.

Review

Simplify each expression. Then, answer the questions.

$4g - g$

What is the value of the expression if $g = 10$?

$h + 4 + h + 2$

What is the value of the expression if $h = 9$?

$j + 3 + k + 2 + j$

What is the value of the expression if $j = 20$ and $k = 8$?

Rewrite each division problem as a multiplication problem and solve. Write your answers in simplest form and convert improper fractions to mixed numbers.

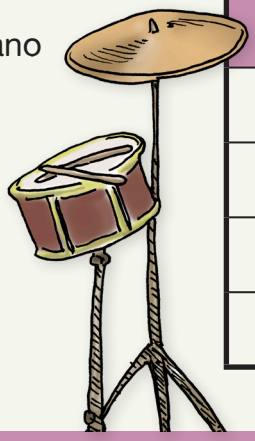
$4 \div \frac{5}{8} =$

$\frac{7}{6} \div \frac{5}{6} =$

$\frac{2}{3} \div \frac{1}{4} =$

Use mental math to complete the chart.

- 16 children play the guitar.
- 25% more children play the piano than play the guitar.
- 50% fewer children play the drums than play the piano.
- 20% fewer children play the clarinet than play the drums.



Instrument	Number of Children
Guitar	
Piano	
Drums	
Clarinet	

Unit Wrap-Up

Find the product or quotient.

0.3 × 0.4 = _____	0.5 × 0.9 = _____	7 × 0.6 = _____
0.02 × 0.4 = _____	0.07 × 0.03 = _____	9 × 0.04 = _____
0.6 ÷ 0.3 = _____	0.35 ÷ 0.07 = _____	1.00 ÷ 0.25 = _____
1.4 ÷ 0.2 = _____	2.0 ÷ 0.5 = _____	0.4 ÷ 0.05 = _____

Find the product.

1.98 × 1.5	0.64 × 0.06	7.01 × 0.4	0.405 × 7.3

Use long division to find the quotient. Write your answers with the given number of decimal digits. Use the multiplication table at the bottom of the page to help with the last problem.

3.7 ÷ 0.6 = _____

2 decimal digits

5.7 ÷ 0.47 = _____

1 decimal digit

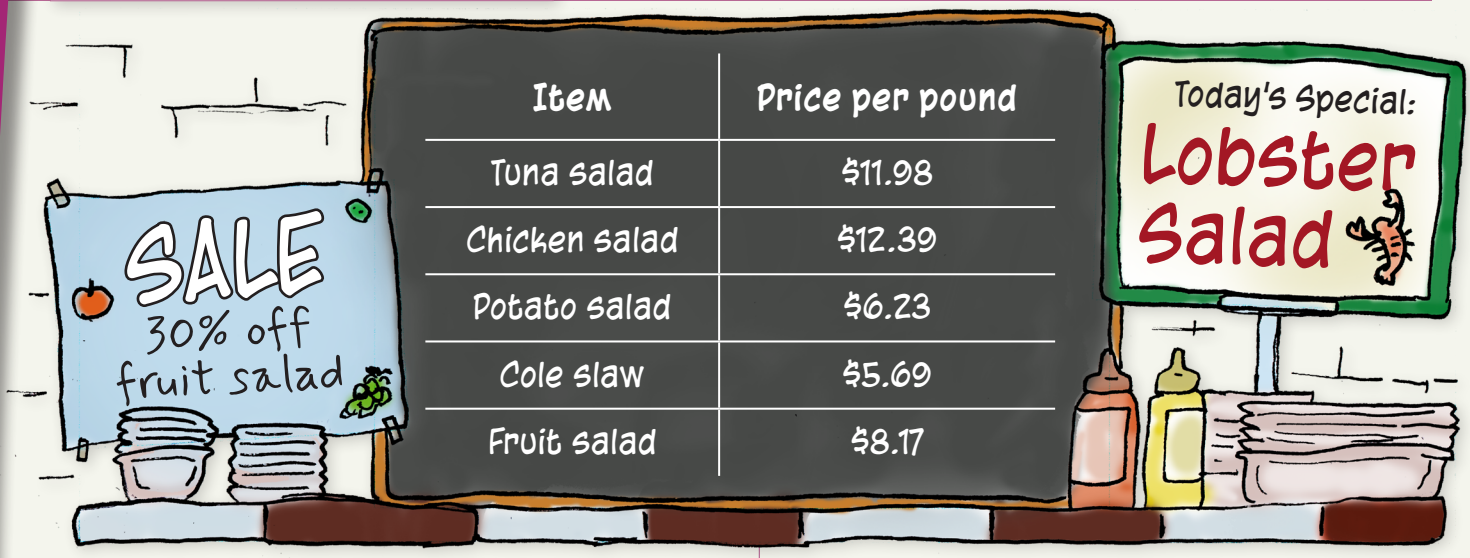
0.6) 3.7

0.47) 5.7

	1	2	3	4	5	6	7	8	9
× 47	47	94	141	188	235	282	329	376	423

Unit Wrap-Up

Use the deli menu and a calculator to answer the questions. Write the equations you use. Write all money amounts with 2 decimal digits.



Item	Price per pound
Tuna salad	$11.98
Chicken salad	$12.39
Potato salad	$6.23
Cole slaw	$5.69
Fruit salad	$8.17

A customer buys 1.74 pounds of tuna salad and 0.83 pounds of chicken salad. How much does he pay?

A customer pays $7.94 for potato salad. How many pounds does he buy?

One serving of cole slaw weighs 0.48 pounds. How many servings are in 2.81 pounds of cole slaw? Write your answer with 1 decimal digit.

A package of lobster salad that weighs 0.42 pounds costs $18.46. What is the price per pound?

If you buy 1.07 pounds of fruit salad at the regular price, how much do you pay?

Fruit salad is on sale today. If you buy 1.07 pounds at the sale price, how much do you pay?