Decimals Summary

KEY TERMS

- kite
- composite solid
- terminating decimal
- repeating decimal

LESSON 1

You Have a Point

A *decimal* is a number that is written in a system based on multiples of 10 and is another representation to show parts of a whole. Decimals are valuable when you need more precision for measurements between whole numbers. They can be represented on a number line. There are an infinite number of decimals between any two decimal values.

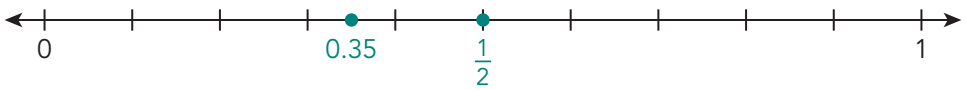
When comparing two decimals, each place value of a decimal needs to be considered. Decimals and fractions can be compared using a number line.

Compare $\frac{1}{2}$ and 0.35. Which value is greater?

First, convert $\frac{1}{2}$ to a decimal.

$\frac{1}{2}$ is equivalent to $\frac{5}{10}$, or 0.5.

Plot each value on a number line.



Because $\frac{1}{2}$ is to the right of 0.35 on the number line, $\frac{1}{2}$ is greater than 0.35, or $\frac{1}{2} > 0.35$.

LESSON 2

Get in Line

When you add or subtract decimals, it is important to align the digits on like place values. Estimating sums or differences gives you a sense of the reasonableness of an answer before you calculate a sum or difference.

$3.421 + 9.5 + 12.85 = ?$

Before calculating the sum, estimate the answer so you know the approximate sum.

$3 + 10 + 13 = 26$

To calculate the exact sum, align the decimals so that like place values are in the same column. You can use the decimal point as a reference point to help you align numbers in the correct place-value column.

$$\begin{array}{r} 3.421 \\ 9.5 \\ +12.85 \\ \hline 25.771 \end{array}$$

The estimate of 26 and the sum of 25.771 are reasonably close, so the sum appears to be correct.

You can use a similar algorithm for subtracting decimals. Let's consider two different subtraction problems.

	$18.205 - 3.91$	$22.4 - 8.936$
First, estimate the answer so you know the approximate difference.	$18 - 4 = 14$	$22 - 9 = 13$
Then, line up the decimals so that like place values are in the same column and subtact.	$\begin{array}{r} {\scriptstyle 7\ \ 11\ 10} \\ 18.\cancel{2}\cancel{0}5 \\ -3.910 \\ \hline 14.295 \end{array}$	$\begin{array}{r} {\scriptstyle 1\ 11\ 13\ 9\ 10} \\ \cancel{22}.\cancel{4}00 \\ -8.936 \\ \hline 13.464 \end{array}$
Compare the answer to your estimate to check your work.	The estimate of 14 and the difference of 14.295 are reasonably close, so the difference appears to be correct.	The estimate of 13 and the difference of 13.464 are reasonably close, so the difference appears to be correct.

LESSON
3

Product Placement

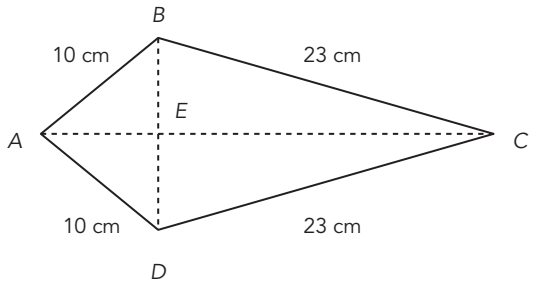
You multiply decimals as you would with whole numbers before placing the decimal point in the product. When multiplying decimals, the number of decimal places in the product is equal to the sum of the decimal places in the factors.

Calculate the product of 32.64×7.3.

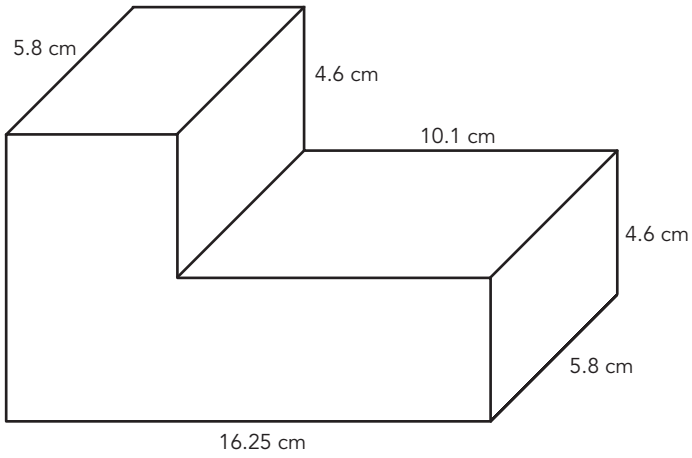
$$\begin{array}{r} 32.64 \\ \times \quad 7.3 \\ \hline 9792 \\ 228480 \\ \hline 238.272 \end{array}$$

The factor 32.64 has two decimal places, and the factor 7.3 has 1 decimal place. The sum of the decimal places in the factors is 3, so the product has three decimal places.

A **kite** is a quadrilateral with two pairs of consecutive congruent sides.



A **composite solid** is made up of more than one geometric solid.



LESSON
4

Dividend in the House

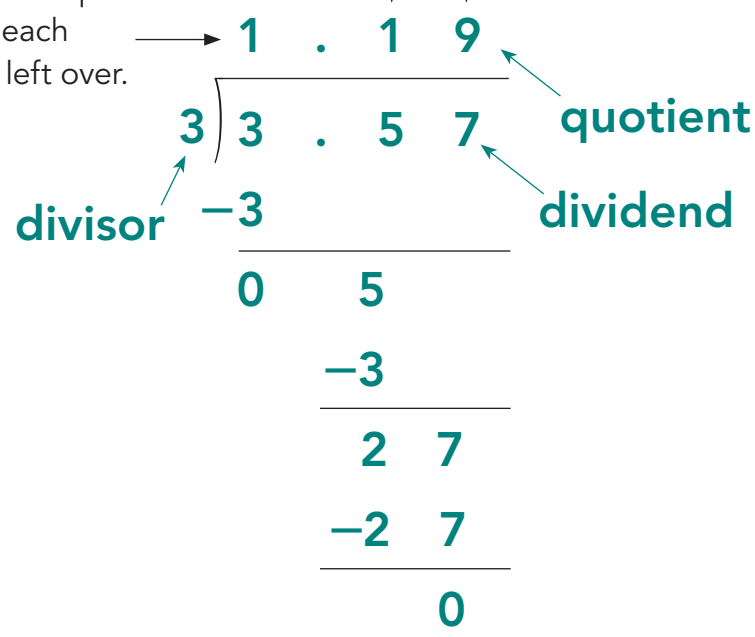
The long division algorithm uses organized estimation and place value to determine a *quotient*, or the number of times the divisor is contained in the dividend. This standard algorithm can be used to divide whole numbers or decimals.

Let's use the standard algorithm to divide 3.57 ÷ 3. The dividend is 3.57 and the divisor is 3.

5 tenths divided into 3 equal groups is 1 tenth in each group with 2 tenths left over.

2 tenths and 7 hundredths is 27 hundredths. 27 hundredths divided into 3 equal groups is 9 hundredths in each group with 0 hundredths left over.

3 ones divided into 3 equal groups is 1 one in each group with 0 ones left over.



The quotient is 1.19; therefore 3.57 ÷ 3 = 1.19.

If you multiply both the dividend and the divisor by the same number, the quotient remains unchanged.

$12 \div 3 = 4$
$(12 \times 10) \div (3 \times 10) = 4$
$(12 \times 100) \div (3 \times 100) = 4$

You can change any divisor into a whole number to make the division of a decimal easier to solve by multiplying both the dividend and divisor by the same multiple of 10. Consider $7.56 \div 3.6$.

Multiply both numbers by the least power of 10 that makes the divisor into a whole number.

$(7.56 \times 10) \div (3.6 \times 10)$
$= 7.56 \div 36$

Then, divide with whole numbers.

$$\begin{array}{r} 2.1 \\ 36\overline{)75.6} \\ -72\downarrow \\ \hline 36 \\ -36 \\ \hline 0 \end{array}$$

You can also change a fraction to a decimal by using the meaning of the fraction bar.

$\frac{3}{8}$ means 3 divided by 8.

$$\begin{array}{r} 0.375 \\ 8\overline{)3.000} \\ -24\downarrow\ \vert \\ \hline 60\ \vert \\ -56\downarrow \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

so $\frac{3}{8} = 0.375$

$\frac{2}{3}$ means 2 divided by 3.

$$\begin{array}{r} 0.666 \\ 3\overline{)2.000} \\ -18\downarrow\ \vert \\ \hline 20\ \vert \\ -18\downarrow \\ \hline 20 \\ -18 \\ \hline 2 \end{array}$$

so $\frac{2}{3} = 0.6\overline{6}$

When the denominator of a fraction divides evenly into the numerator, the resulting decimal is a **terminating decimal** because it has digits that end. From the example above, 0.375 is a terminating decimal.

When the denominator of a fraction does not divide evenly into the numerator, the resulting decimal is a **repeating decimal** because a digit or group of digits repeats without end. From the example above, $0.6\overline{6}$ is a repeating decimal.