

DECIMAL DIVISION

Decimal division is useful in every day mathematics like dividing money amounts equally and finding averages. A critical point with division of decimals is placing the decimal point correctly. We will practice many types of decimal division.

Divide Decimals

Dividing Decimals by Whole Numbers

To divide a decimal by a whole number, place the decimal point in the quotient above the decimal point in the dividend.

quotient – the answer to a division problem

dividend – the number that is to be divided

divisor – the number by which the dividend is being divided

Example 1: Find the quotient.

Divide: 16.8 by 24

Estimate
 $20 \div 20 = 1$

$$\begin{array}{r} \text{Divisor} \rightarrow 24 \overline{)16.8} \leftarrow \text{Quotient} \\ \underline{168} \leftarrow \text{Dividend} \end{array}$$

The quotient of 16.8 divided by 24 is 0.7.

☑ *Quick Check:* The estimate of 1 is close to 0.7.

Dividing By Decimals in Tenths

To divide a decimal by a decimal:

- Make the divisor a whole number.

Do this by multiplying the divisor by the power of ten that would **move the decimal point to the right of all of the digits in the divisor.**

- Multiply the dividend by the same power of ten used to make the divisor a whole number.

There are five steps in long division:

| | |
|------------|-------------------|
| Divide | \div |
| Multiply | \times |
| Subtract | $-$ |
| Compare | <i>compare</i> |
| Bring Down | <i>bring down</i> |

Example 2: Find the quotient.

Divide: 29.24 by 3.4

Estimate
 $30 \div 3 = 10$

$$\begin{array}{r} 3.4 \overline{)29.24} \\ \underline{168} \\ \end{array}$$

The divisor and dividend must be multiplied by 10 to make the divisor a whole number. The short cut for multiplying by 10 is move the decimal

For this problem, repeat the “five steps of long division” until the division “comes out even”; that is, divide until the remainder is zero.

5 Steps of Division

- **Divide:** 34 into 292 to get 8
- Multiply:** 8×34 to get 272
- Subtract:** 272 from 292 to get 20
- Compare:** 20 with 34
(20 must be smaller than 34)
- Bring Down:** 4

*Divide, Multiply,
Subtract, Compare*

$$\begin{array}{r} 8. \\ 34 \overline{)292.4} \\ \underline{272} \\ 20 \end{array}$$

*Bring down
and start over.*

$$\begin{array}{r} 8.6 \\ 34 \overline{)292.4} \\ \underline{272} \\ \\ \end{array}$$

The quotient of 29.24 divided by 3.4 is 8.6.

☑ *Quick Check:* The estimate of 10 is close to 8.6.

Dividing By Decimals in Hundredths

Example 3: Find the quotient.

Divide: 8.0124 by 1.32

Estimate

$$8 \div 1 = 8$$

$$\begin{array}{r} 1.32 \overline{)8.0124} \\ \end{array}$$

The divisor and dividend must be multiplied by 100 to make the divisor a whole number. The short cut for multiplying by 100 is move the decimal point two places to the right.

For this problem, repeat the “five steps of long division” until the division “comes out even”; that is, divide until the remainder is zero.

$$\begin{array}{r} 6. \\ 132 \overline{)801.24} \\ \underline{792} \\ 92 \end{array}$$

$$\begin{array}{r} 6.0 \\ 132 \overline{)801.24} \\ \underline{792} \\ 92 \\ \underline{0} \end{array}$$

$$\begin{array}{r} 6.07 \\ 132 \overline{)801.24} \\ \underline{792} \\ 92 \\ \underline{0} \\ 924 \\ \underline{924} \end{array}$$

The quotient of 8.0124 divided by 1.32 is 6.07.

Quick Check: The estimate of 8 is close to 6.07.

Dividing Whole Numbers by Decimals

When the dividend is a whole number, first show the decimal point after the dividend, and then move the decimal point to the right as many places as determined by making the divisor a whole number.

Example 4: Find the quotient.

Divide: 75 by 0.25

$$\begin{array}{r} 300. \\ 0.25 \overline{)75.00} \\ \underline{75} \\ 00 \\ \underline{00} \\ 00 \end{array}$$

The divisor and dividend must be multiplied by 100 to make the divisor a whole number. The short cut for multiplying by 100 is move the decimal point two places to the right.

The quotient of 75 divided by 0.25 is 300.

Click on the bricks below to play a game.



Dividing Decimals and Rounding Quotients

In division, sometimes the answer does not come out even. When this occurs, divide until the quotient has one extra decimal place, and then round to the given place.

*The symbol for approximately equal to is “ \approx ”.

Example 5: Find the quotient. Round the answer to the nearest hundredth.

Divide until the quotient is in thousandths, and then round to hundredths.

Divide: 95.8 by 0.24

$$\begin{array}{r} 0.24 \overline{)95.80} \\ \hline \end{array}$$
$$\begin{array}{r} 399.166 \approx 399.17 \\ 24 \overline{)9580.000} \\ \hline \underline{72} \\ 238 \\ \underline{216} \\ 220 \\ \underline{216} \\ 40 \\ \underline{24} \\ 160 \\ \underline{144} \\ 160 \\ \underline{144} \\ 16 \end{array}$$

The quotient of 95.8 divided by 0.24 is approximately equal to 399.17.