

Divide Decimals by Decimals 1

1. Solve, thinking carefully about how many times the divisor “fits into” the dividend. Compare the problems within the same “box.” What do you notice?

a. $120 \div 20 =$	e. $28 \div 4 =$
b. $12 \div 2 =$	f. $2.8 \div 0.4 =$
c. $1.2 \div 0.2 =$	g. $0.28 \div 0.04 =$
d. $0.12 \div 0.02 =$	h. $0.028 \div 0.004 =$

Here’s an Important Principle!

Consider any division problem. If you multiply the *dividend* and the *divisor* by the same number, the *quotient* stays the same.

Example 1. Solve $6 \div 0.3$.

Suppose we multiply both 6 and 0.3 by 10 to get a new division problem: $60 \div 3$. It has the same answer as the original problem, $6 \div 0.3$. The answer to *both* problems is 20.

Example 2. Solve $\frac{56.4}{0.04}$.

Let’s multiply both the dividend and the divisor by 100 to get a new problem: $\frac{5,640}{4}$. Now we use long division to solve it (at the right →):

$$\begin{array}{r} 1410 \\ 4 \overline{) 5640} \\ \underline{-4} \\ 16 \\ \underline{-16} \\ 0 \end{array}$$

Since $\frac{5,640}{4}$ equals 1,410, so does $\frac{56.4}{0.04}$. Does that make sense?

Think: How many times does 0.04 (a tiny number) fit into 56.4? It does make sense that it would fit over 1,000 times. A thousand times 0.04 equals 40. Moreover, 1,500 times 0.04 would be 60. So 1,410 times 0.04 being 56.4 does make sense.

You have already seen this principle with equivalent fractions. We can multiply the numerator and the denominator by the same number, and the value of the fraction stays the same.

Remember, fractions are just *division problems*. We use the same principle whenever we write a division problem using a fraction line.

Our goal is always to make the *divisor* on the bottom into a whole number.

$$\frac{3}{7} = \frac{6}{14}$$

× 2 (above) / × 2 (below)

OR

$$\frac{2}{5} = \frac{20}{50}$$

× 10 (above) / × 10 (below)

$$\frac{0.5}{0.2} = \frac{5}{2} = 2.5$$

× 10 (above) / × 10 (below)

OR

$$\frac{6.4}{0.08} = \frac{640}{8} = 80$$

× 100 (above) / × 100 (below)

2. Multiply both the dividend and the divisor by the same given number. Then divide mentally.

<p>a. $\frac{9}{0.3} = \frac{\overset{\times 10}{9}}{\underset{\times 10}{0.3}} = \underline{\quad} =$</p>	<p>b. $\frac{2}{0.05} = \frac{\overset{\times 100}{2}}{\underset{\times 100}{0.05}} = \underline{\quad} =$</p>	<p>c. $\frac{0.3}{0.006} = \frac{\overset{\times 1000}{0.3}}{\underset{\times 1000}{0.006}} = \underline{\quad} =$</p>
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3. Do the same as above. Choose a factor that will turn the divisor on the bottom into a whole number. Multiply both the dividend and the divisor by that same factor. Then divide mentally.

<p>a. $\frac{16}{0.4} = \underline{\quad} =$</p>	<p>b. $\frac{7}{0.07} = \underline{\quad} =$</p>	<p>c. $\frac{99}{0.11} = \underline{\quad} =$</p>
<p>d. $\frac{3.4}{0.2} = \underline{\quad} =$</p>	<p>e. $\frac{0.56}{0.8} = \underline{\quad} =$</p>	<p>f. $\frac{15}{0.003} = \underline{\quad} =$</p>

4. Multiply both the dividend and the divisor by the same number (10, 100, or 1,000), so that you get a new division problem where the divisor will be a whole number. Then divide mentally.

<p>a. $0.8 \div 0.02$ $\underline{\quad} \div \underline{\quad} = \underline{\quad}$</p>	<p>b. $0.42 \div 0.007$ $\underline{\quad} \div \underline{\quad} = \underline{\quad}$</p>	<p>c. $35 \div 0.5$ $\underline{\quad} \div \underline{\quad} = \underline{\quad}$</p>
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5. Multiply both the dividend and the divisor by the same number (10, 100, or 1000) so that you get a *whole-number divisor*. Then divide using long division.

<p>a. $27.6 \div 0.3$</p> $\frac{27.6}{0.3} = \underline{\quad}$	<p>b. $2.088 \div 0.06$</p> $\underline{\quad} = \underline{\quad}$
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