# Dividing Numbers that Result in a Decimal

Let's find quotients that are not whole numbers.

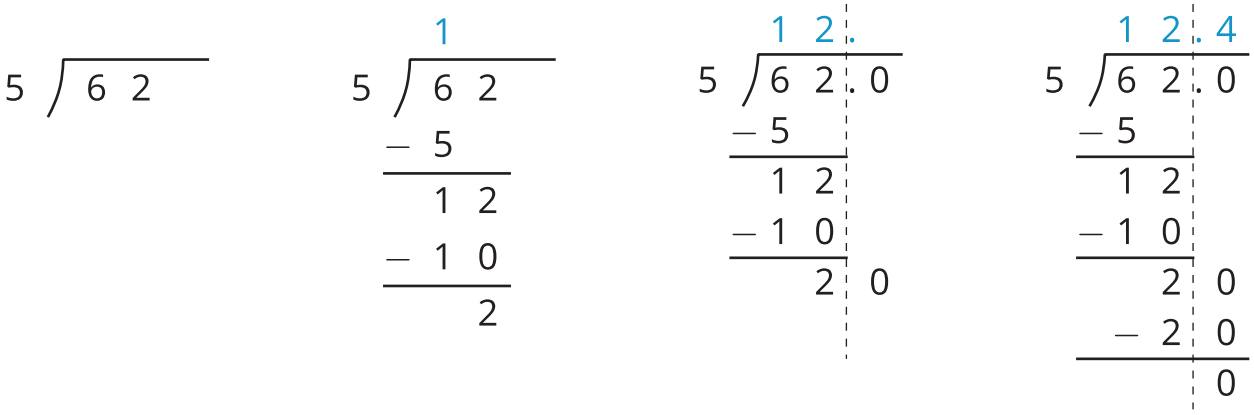
## 12.1 Math Talk: Dividing by 4

Find the value of each quotient mentally.

- $80 \div 4$
- $12 \div 4$
- $1.2 \div 4$
- $81.2 \div 4$

# 12.2 Whole Numbers No More

Here is how Lin calculated $62 \div 5$.




1. Discuss with your partner:

   a. In the third step, Lin drew a vertical dashed line to the right of the 2 in 62. What do you think that line is for?

   b. She also wrote a point and a 0 to the right of 62. Then she put a 0 after the remainder of 2. What do you think the zeros are for?

   c. Lin subtracted 5 groups of 4 from 20. What value does the 4 in the quotient represent?

   d. What value did Lin find for $62 \div 5$?

2. Use long division to find the value of each expression. Then pause so your teacher can review your work.

   a. $126 \div 8$

   b. $90 \div 12$


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3. Use long division to show that:

   $5 \div 4$, or $\frac{5}{4}$, is 1.25.  $4 \div 5$, or $\frac{4}{5}$, is 0.8.  $1 \div 8$, or $\frac{1}{8}$, is 0.125.

## Are you ready for more?

Noah said we cannot use long division to calculate $10 \div 3$ because there will always be a remainder.

1. What do you think Noah meant by "there will always be a remainder"? Explain your reasoning.

2. What do you think is the value of $10 \div 3$?


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# 12.3 Using Long Division to Divide Decimals

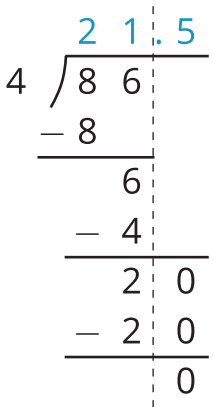
Use long division to answer each question.

1. What is the value of $53.8 \div 4$?

2. Five students raised $77.40 for a charity. If everyone raised the same amount, how much money did each student raise?

## Lesson 12 Summary

We can use long division to find quotients even when the numbers involved are not whole numbers. Here is the long-division calculation of $86 \div 4$, which results in a decimal quotient.




The calculation shows that, after removing 4 groups of 21, there are 2 ones remaining. We can continue dividing by writing a 0 to the right of the 2 and thinking of that remainder as 20 tenths, which can then be divided into 4 groups.

To show that the quotient we are working with now is in the tenths place, we put a decimal point to the right of the 1 (which is in the ones place) at the top. It may also be helpful to draw a vertical line to separate the ones and the tenths.

There are 4 groups of 5 tenths in 20 tenths, so we write 5 in the tenths place at the top. The calculation likewise shows $86 \div 4 = 21.5$.