

Name: _____

Date: _____

An Introduction to Partial Quotients

Partial quotients is a way to divide that uses your multiplication skills. First, you will set up your problem so the **dividend** (the number that is being divided) is inside a bracket. The **divisor** (the number of groups you are dividing into) is on the outside of the bracket.

$$\begin{array}{r} 514 \div 3 \\ 3 \overline{) 514} \end{array}$$

It takes several steps to find the **quotient** (the answer to a division problem). At each step, you will find a **partial quotient** (a part of the answer).

As you go through each step, you will think, "What number times the divisor will get me close to the dividend?"

You can use numbers that are easy to multiply, like multiples of 10. In this example, 3×100 is an easy number to multiply with mental math. 100 is the partial quotient, which means 3 can go into 514 one hundred times.

$$\begin{array}{r} 514 \div 3 \\ 3 \overline{) 514} \\ \underline{- 300} \\ 214 \end{array} \quad 100 \leftarrow \text{partial quotient}$$

3 x 100 is 300

Then, you'll subtract the product (300 in this example) from the dividend to find what is left to divide.

You will continue to multiply and subtract until you have divided the entire dividend. If you are left with a part that is smaller than the divisor, you will call that the **remainder**.

Add up all the partial quotients along the right side of the problem to find the quotient.

$$\begin{array}{r} 514 \div 3 \\ 3 \overline{) 514} \\ \underline{- 300} \\ 214 \\ \underline{- 210} \\ 4 \\ \underline{- 3} \\ 1 \end{array} \quad \begin{array}{r} 100 \\ 70 \\ \hline 171 \end{array}$$

since 3 x 7 is 21, I know that 3 x 70 is 210

Why do we use this strategy?

Using partial quotients strengthens our foundational understanding of division, supports flexible thinking and number sense, connects to concepts of multiplication that we have learned, and builds our competency in mental math. This will help us in real world situations. It can be used for day-to-day computation or as a bridge to understanding the standard algorithm.

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Try it! Solve each problem using partial quotients.

Example

$$475 \div 6$$

$$\begin{array}{r|l} 6 & 475 \\ - & 300 & 50 \\ \hline & 175 \\ - & 120 & 20 \\ \hline & 55 \\ - & 54 & + 9 \\ \hline & 1 & 79 \end{array}$$

$$\therefore 475 \div 6 = 79 \text{ r}1$$

$$352 \div 7$$

$$\begin{array}{r|l} 7 & 352 \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \\ \hline & \end{array}$$

$$\therefore 352 \div 7 =$$

$$621 \div 5$$

$$589 \div 4$$

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Let's Review! Fill in each blank with the correct vocabulary word.

1. The number that is being divided is called the _____.
2. The number of groups you are dividing into is called the _____.
3. The answer to a division problem is the _____.
4. Part of the answer is called _____.
5. After dividing, if there is a number left that is too small to be divided into a whole number, it is called the _____.
6. What self talk can you use as you solve a problem with this method? _____

7. What is one reason you would use this strategy? _____

8. Jamie tried solving a division problem using partial quotients, but she made a mistake!

$$\begin{array}{r|l} 4 & 219 \\ - & 200 & 50 \\ \hline & 19 \\ - & 18 & + 4 \\ \hline & 1 & 54 \end{array}$$

$\therefore 219 \div 4 = 54 \text{ r}1$

What would you tell Jamie to help her fix her error?
