

Partial Quotients Division Explained

Parents: Your child has been working on long division. This explains the Partial Quotients Method. The students may use this method or the traditional method to complete any assignments.

Step 1:

$8 \overline{) 177}$

Start by setting up the problem like this. It looks just like the traditional long division method, except for the long line that is drawn to the right of the divisor.

Step 4:

$8 \overline{) 177} \quad 10$
 $\underline{- 80}$
 97

Subtract 177 minus 80.

Step 2:

$8 \overline{) 177} \quad 10$

Ask - How many [8s] are in 177? There are at least 10, so that will be the first partial quotient.

Notice that you could pick other partial quotients here. You could have started with 20, or even a lower number like 5.

A good tip is to start with easy multiples, like 10, 20, 50, or 100.

Step 5:

$8 \overline{) 177} \quad 10$
 $\underline{- 80}$
 $97 \quad 10$

Start the process over again. Ask - how many [8s] are in 97?

Again, there are at least 10.

Step 3:

$8 \overline{) 177} \quad 10$
 $\underline{80}$

Multiply $10 * 8$

Step 6:

$8 \overline{) 177} \quad 10$
 $\underline{- 80} \quad 10$
 97
 $\underline{80}$

Multiply $10 * 8$.

Step 7:

Subtract 97 minus 80.

$$\begin{array}{r}
 8 \overline{) 177} \quad 10 \\
 \underline{- 80} \\
 97 \quad 10 \\
 \underline{- 80} \\
 17
 \end{array}$$

Step 11:

Since the 1 is less than 8, you are finished. Now add up the partial quotients - 10 plus 10 plus 2.

$$\begin{array}{r}
 8 \overline{) 177} \quad 10 \\
 \underline{- 80} \\
 97 \quad 10 \\
 \underline{- 80} \\
 17 \quad 2 \\
 \underline{- 16} \\
 1 \quad 22
 \end{array}$$

Step 8:

Start the process again. Ask - how many [8s] are in 17. There are at least 2.

$$\begin{array}{r}
 8 \overline{) 177} \quad 10 \\
 \underline{- 80} \\
 97 \quad 10 \\
 \underline{- 80} \\
 17 \quad 2
 \end{array}$$

Step 12:

Write the answer above with the remainder. You are finished.

$$\begin{array}{r}
 22 \text{ R}1 \\
 8 \overline{) 177} \quad 10 \\
 \underline{- 80} \\
 97 \quad 10 \\
 \underline{- 80} \\
 17 \quad 2 \\
 \underline{- 16} \\
 1 \quad 22
 \end{array}$$

Step 9:

Multiply 2 * 8.

$$\begin{array}{r}
 8 \overline{) 177} \quad 10 \\
 \underline{- 80} \\
 97 \quad 10 \\
 \underline{- 80} \\
 17 \quad 2 \\
 \underline{- 16}
 \end{array}$$

Step 13:

Notice that you could have done the problem differently by picking different partial quotients. You could have completed the problem in fewer steps by picking partial quotients that were closer to the answer.

Here, the student starts with a partial quotient of 20.

$$8 \overline{) 177}$$

Step 10:

Subtract 17 minus 16.

$$\begin{array}{r}
 8 \overline{) 177} \quad 10 \\
 \underline{- 80} \\
 97 \quad 10 \\
 \underline{- 80} \\
 17 \quad 2 \\
 \underline{- 16} \\
 1
 \end{array}$$

Step 14:

$$8 \overline{) 177} \quad 20$$

Step 18:

Multiply 2 * 8.

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline 17 \end{array} \quad 2$$

$$\begin{array}{r} - 16 \\ \hline \end{array}$$

Step 15:

Multiply 20 * 8

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline \end{array}$$

Step 19:

Subtract 17 minus 16.

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline 17 \\ - 16 \\ \hline 1 \end{array} \quad 2$$

Step 16:

Subtract 177 minus 160.

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline 17 \end{array}$$

Step 20:

Since the 1 is less than 8, you are finished. Now add up the partial quotients - 20 plus 2.

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline 17 \\ - 16 \\ \hline 1 \end{array} \quad \begin{array}{r} 20 \\ 2 \\ \hline 22 \end{array}$$

Step 17:

Start the process over again. Ask - how many [8s] are in 17? There are at least 2.

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline 17 \end{array} \quad 2$$

Step 21:

Write the answer above with the remainder. You are finished.

$$8 \overline{) 177} \quad 20$$

$$\begin{array}{r} - 160 \\ \hline 17 \\ - 16 \\ \hline 1 \end{array} \quad \begin{array}{r} 22 \text{ R}1 \\ 20 \\ 2 \\ \hline 22 \end{array}$$