Unit 6, Lesson 18

Use an Algorithm with Partial Quotients

Let's find quotients using an algorithm that uses partial quotients.

Warm-up

Number Talk: Partial Quotients

Find the value of each expression mentally.

- $500 \div 5$

- $60 \div 5$

- $5 \div 5$

- $565 \div 5$

Activity 1

A Stack of Partial Quotients

Jada uses partial quotients to find out how many groups of 7 are in 392.

1. Analyze Jada's steps in the partial-quotients algorithm.

```
  56
   9
   7
  40
7 )392
 − 280
  112
 −  49
   63
 −  63
    0
```

   a. Look at the 3 numbers above 392. What do they represent?

   b. Look at the 3 subtractions below 392. What do they represent?

2. Show another way you can decompose 392 to divide by 7.

3. Use a partial-quotients algorithm to find the value of $702 \div 3$.

Activity 2

Andre and Elena's Work

Andre and Elena divide 2,315 by 5. Before they begin, Andre says, "I can already tell that the quotient is going to be less than 500."

1. Decide if you agree with Andre without doing any calculations. Explain your reasoning.

2. Here is Andre and Elena's work. Each student made one or more errors. Identify the errors each student made. Then show a correct computation.

Andre's Work

```
  103
    3
   60
   40
5 ) 2,315
 −2,000
    315
 −  300
     15
 −   15
      0
```

Elena's Work

```
  400
   60
  100
  300
5 ) 2,315
 −1,500
    815
 −  500
    315
 −  300
     15
```

Activity 3

Incomplete Calculations

Here are 4 calculations to find the value of $3{,}294 \div 3$, but each one is unfinished.

Complete at least 2 of the unfinished calculations.

A

$$
\begin{array}{rl}
90 & \\
1{,}000 & \\
3\overline{)3{,}294} & \\
-3{,}000 & 3 \times 1{,}000 \\
\hline
294 & \\
-\ 270 & 3 \times 90 \\
\hline
\end{array}
$$

B

$$
\begin{array}{rl}
80 & \\
200 & \\
400 & \\
400 & \\
3\overline{)3{,}294} & \\
-1{,}200 & 3 \times 400 \\
\hline
2{,}094 & \\
-1{,}200 & 3 \times 400 \\
\hline
894 & \\
-\ 600 & 3 \times 200 \\
\hline
294 & \\
-\ 240 & 3 \times 80 \\
\hline
\end{array}
$$

C

$600 \div 3 =$
$600 \div 3 =$
$600 \div 3 =$
$600 \div 3 =$
$600 \div 3 =$
$270 \div 3 =$

D

$$
\begin{array}{rl}
3{,}300 \div 3 = & 1{,}100 \\
-\quad 6 \div 3 = & \quad 2 \\
\hline
\end{array}
$$