

Steps to Success for Partial Quotients

1. Write division problem and draw a line down on right side of dividend.
2. Write the divisor next to the right of the line as a factor in a multiplication problem.
3. Think in multiples of 10, 100, or 1,000 times the divisor.
 - Write this answer as a factor with the divisor
 - Write the product below the dividend
4. Subtract the dividend and the product of the problem off to the right of the line.
5. Repeat steps 2-4 until you subtract and get a remainder less than the divisor or a zero.
6. Circle all of the outside factors (multiples of 10, 100, or 1,000) and add to find the quotient.
7. Check
 - Is my quotient in place value above dividend? ✓
 - Does my answer make sense (remainder less than divisor?) ✓
 - Multiply quotient by divisor and add remainder to product. $284 \times 23 = 6532$ ✓

Handwritten Solution for $284 \div 23$:

Thought bubble: 25

Initial setup: $23 \overline{) 6532}$

Step 1: $23 \times 100 = 2300$. Subtract: $6532 - 2300 = 4232$. (Crossed out)

Step 2: $23 \times 100 = 2300$. Subtract: $4232 - 2300 = 1932$. (Crossed out)

Step 3: $23 \times 70 = 1610$. Subtract: $1932 - 1610 = 322$. (Crossed out)

Step 4: $23 \times 10 = 230$. Subtract: $322 - 230 = 92$. (Crossed out)

Step 5: $23 \times 4 = 92$. Subtract: $92 - 92 = 0$. (Crossed out)

Final Quotient: 284

Check:

$$\begin{array}{r} 23 \\ \times 284 \\ \hline 92 \\ 1610 \\ 4600 \\ \hline 6532 \end{array}$$

Review to Compare

Standard Algorithm

$$\begin{array}{r} \overset{x}{15} \overline{) 87407} \\ \underline{-75} \\ 12407 \\ \underline{-1200} \\ 407 \\ \underline{-400} \\ 7 \end{array}$$

$15 \times 560 = 8400$ (indicated by a red arrow from the text $15 \times ? = 7$ to the 560 above the dividend)

$15 \times 47 = 705$ (indicated by a red arrow from the text $15 \times ? = 7$ to the 47 above the dividend)

Final remainder: 7

Partial Quotients

$$\begin{array}{r} 560 \text{ r } 7 \\ 15 \overline{) 87407} \\ \underline{-75000} \\ 12407 \\ \underline{-12000} \\ 407 \\ \underline{-400} \\ 7 \end{array}$$

$15 \times 500 = 75000$ (indicated by a red arrow from the text $15 \times ? = 7$ to the 500 in the partial quotient)

$15 \times 60 = 900$ (indicated by a red arrow from the text $15 \times ? = 7$ to the 60 in the partial quotient)

Final remainder: 7

$$\begin{array}{r}
 +3 \\
 24 \\
 \times 9 \\
 \hline
 216 \\
 +2 \\
 24 \\
 \times 5 \\
 \hline
 120
 \end{array}$$

$$\begin{array}{r}
 195 \text{ r } 23 \\
 24 \overline{) 4703} \\
 \underline{- 2400} \quad = 24 \times 100 \\
 2303 \\
 \underline{- 2160} \quad = 24 \times 90 \\
 143 \\
 \underline{- 120} \quad = 24 \times 5 \\
 23
 \end{array}$$

Less than my divisor of 24 so this is my remainder