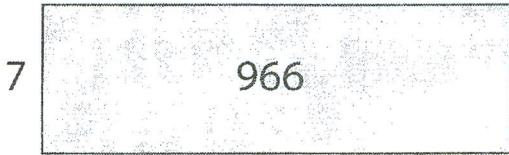


Area/array drawing for $966 \div 7$

? hundreds + ? tens + ? ones

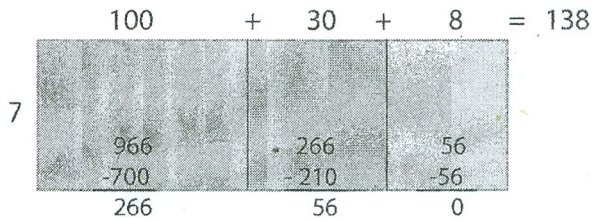


$$\begin{array}{r} ??? \\ 7 \overline{)966} \end{array}$$

Thinking: A rectangle has area 966 and one side of length 7. Find the unknown side length. Find hundreds first, then tens, then ones.

$$\begin{aligned} 966 &= 7 \times 100 + 7 \times 30 + 7 \times 8 \\ &= 7 \times (100 + 30 + 8) \\ &= 7 \times 138 \end{aligned}$$

Method A:



$$\begin{array}{r} 8 \\ 30 \\ 100 \\ \hline 7 \overline{)966} \\ -700 \\ \hline 266 \\ -210 \\ \hline 56 \\ -56 \\ \hline 0 \end{array} \quad \left. \begin{array}{l} 8 \\ 30 \\ 100 \end{array} \right\} 138$$

$$543 \div 4 = ?$$

	4
$\times 100$	543 -400 ----- 143
$\times 30$	143 -120 ----- 23
$+ \times 5$	23 -20 ----- 3
	135 r 3

135r3

Decompose the Quotient to Divide

Example $462 \div 6 = (420 \div 6) + (42 \div 6)$
 $1 \quad (420 + 42) = 462 \quad 70 + 7 = 77$

Example $4630 \div 15$
 $2 \quad 4500 \div 15 = 300$
 $90 \div 15 = 6$
 $40 \div 15 = 2 \text{ r } 10$
 $300 + 6 + 2 = 308 \text{ r } 10$

$$\begin{array}{r} 4630 \\ -4500 \\ \hline 130 \\ -90 \\ \hline 40 \end{array}$$

Expanded Notation Division

Example 1
 $3,822 \div 7 = 546$

Build a new section with each leftover amount.

500		500 + 40		500 + 40 + 6 = 546
7 $\overline{) 3,822}$ -3,500 322		7 $\overline{) 3,822 \quad 322}$ -3,500 -280 322 42		7 $\overline{) 3,822 \quad 322 \quad 42}$ -3,500 -280 -42 322 42

Example 2
 $2,048 \div 32 = 64$

Rectangle Sections

60	60	60 +	60 + 4
32 $\overline{) 2,048}$ (30) 2,048	32 $\overline{) 2,048}$ (30) -1,920 128	32 $\overline{) 2,048 \quad 128}$ (30) 1,920 128	32 $\overline{) 2,048 \quad 128}$ (30) -1,920 -128 128 0
Round the divisor and estimate the first number.	Multiply and subtract.	Make a new section.	Estimate the next number, and multiply and subtract.

Partial Quotients

Example 1

$$\begin{array}{r}
 6 \overline{) 3950} \\
 \underline{- 3600} \quad \times 600 \\
 350 \\
 \underline{- 300} \quad \times 50 \\
 50 \\
 \underline{- 48} \quad \times 8 \\
 \hline
 2
 \end{array}$$

$$\begin{aligned}
 6 \times 100 &= 600 \\
 6 \times 600 &= 3600 \\
 6 \times 50 &= 300 \\
 6 \times 8 &= 48
 \end{aligned}$$

$$600 + 50 + 8 = \boxed{658 \text{ r } 2}$$

Example 2

$$\begin{array}{r}
 28 \overline{) 34350} \\
 \underline{- 2800} \quad \times 100 \\
 1550 \\
 \underline{- 1400} \quad \times 50 \\
 150 \\
 \underline{- 140} \quad \times 5 \\
 10
 \end{array}$$

$$\begin{aligned}
 28 \times 100 &= 2800 \\
 28 \times 50 &= 1400 \\
 28 \times 5 &= 140
 \end{aligned}$$

$$100 + 50 + 5 = 155$$

$$\boxed{155 \text{ r } 10}$$

Example 3

$$3,822 / 7 = 546$$

Expanded Notation

$$\begin{array}{r}
 500 \\
 7 \overline{) 3,822} \\
 \underline{- 3,500} \\
 322
 \end{array}$$

Show the zeros in the place values.

$$\begin{array}{r}
 40 \\
 500 \\
 7 \overline{) 3,822} \\
 \underline{- 3,500} \\
 322 \\
 \underline{- 280} \\
 42
 \end{array}$$

$$\begin{array}{r}
 6 \\
 40 \\
 500 \\
 7 \overline{) 3,822} \\
 \underline{- 3,500} \\
 322 \\
 \underline{- 280} \\
 42 \\
 \underline{- 42}
 \end{array}$$

Example 4

$$2,048 / 32 = 64$$

Expanded Notation

$$\begin{array}{r}
 32 \overline{) 2,048} \\
 (30)
 \end{array}$$

Round the divisor.

$$\begin{array}{r}
 60 \\
 32 \overline{) 2,048} \\
 (30)
 \end{array}$$

Estimate the first number:

30 goes into 2,000 about 60 times.

$$\begin{array}{r}
 60 \\
 32 \overline{) 2,048} \\
 (30) \underline{- 1,920} \\
 128
 \end{array}$$

Multiply and subtract.
 $60 \times 32 = 1,920$

$$\begin{array}{r}
 4 \\
 60 \overline{) 64} \\
 32 \overline{) 2,048} \\
 (30) \underline{- 1,920} \\
 128 \\
 \underline{- 128}
 \end{array}$$

Estimate the next number and multiply.

Traditional Long Division Method

Example 1

$$3,822 / 7 = 546$$

$$\begin{array}{r}
 5 \\
 7 \overline{) 3,822} \\
 \underline{- 3,5} \\
 32
 \end{array}$$

Put in only one digit at a time.

$$\begin{array}{r}
 54 \\
 7 \overline{) 3,822} \\
 \underline{- 3,5} \\
 32 \\
 \underline{- 28} \\
 42
 \end{array}$$

$$\begin{array}{r}
 546 \\
 7 \overline{) 3,822} \\
 \underline{- 3,5} \\
 32 \\
 \underline{- 28} \\
 42 \\
 \underline{- 42}
 \end{array}$$

Example 2

$$2,048 / 32 = 64$$

Step 1
Digit-by-Digit

$$\begin{array}{r}
 32 \overline{) 2,048} \\
 (30)
 \end{array}$$

Round the divisor.

Step 2

$$\begin{array}{r}
 6 \\
 32 \overline{) 2,048} \\
 (30)
 \end{array}$$

Estimate the first digit:
30 goes into 2,000 about 6 times.

Step 3

$$\begin{array}{r}
 6 \\
 32 \overline{) 2,048} \\
 (30) \underline{- 1,92} \\
 128
 \end{array}$$

Multiply and subtract.
Bring down 8 ones.

Step 4

$$\begin{array}{r}
 64 \\
 32 \overline{) 2,048} \\
 (30) \underline{- 1,92} \\
 128 \\
 \underline{- 128}
 \end{array}$$

Estimate the next digit and multiply.