



Roots of Reason

Name _____ Date _____

Ones and Zeros

Four rules that look alike. Each one answers a **different question**.

1. Answer each one. Before you write, say the question in your head: groups of what?

$7 \div 1 = \underline{\hspace{2cm}}$

$7 \times 1 = \underline{\hspace{2cm}}$

$7 \times 0 = \underline{\hspace{2cm}}$

$9 \div 1 = \underline{\hspace{2cm}}$

$0 \div 9 = \underline{\hspace{2cm}}$

$9 \div 9 = \underline{\hspace{2cm}}$

$12 \div 1 = \underline{\hspace{2cm}}$

$12 \times 0 = \underline{\hspace{2cm}}$

$12 \div 12 = \underline{\hspace{2cm}}$

2. Sort these five into the column that tells what happens: $6 \div 1$, 6×0 , $0 \div 6$, $6 \div 6$, 6×1

stays 6

becomes 0

becomes 1

3. **Find the flaw.** A student answered $8 \div 1 = 1$, and did the same for ten problems in a row. Which rule was he thinking of, and why does it not apply here?

Dividing by 1 changes **nothing**. Multiplying by 0 erases **everything**.



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Neighbor Facts

Most wrong answers are **right answers to the problem next door**.

1. Solve each pair. They are neighbors, so slow down at the fence.

$12 \times 6 = \underline{\hspace{2cm}}$

$12 \times 7 = \underline{\hspace{2cm}}$

$36 \div 6 = \underline{\hspace{2cm}}$

$36 \div 12 = \underline{\hspace{2cm}}$

$8 \times 8 = \underline{\hspace{2cm}}$

$8 \div 8 = \underline{\hspace{2cm}}$

$8 \times 12 = \underline{\hspace{2cm}}$

$96 \div 12 = \underline{\hspace{2cm}}$

2. Two of these are wrong. Circle them on paper or say them out loud, then type the corrected facts below.

$8 \times 12 = 96$

$12 \times 7 = 72$

$36 \div 12 = 3$

$5 \times 9 = 30$

$48 \div 12 = 4$

fix 1: _____

fix 2: _____

3. $12 \times 7 = 72$ is a true answer to a **different** problem. Write that problem, then explain a way to catch this mix-up before it happens.

A near miss is a **true fact in the wrong place**. Check the neighbor before you commit.

Too big to hold in your head. Split it, and let the **paper hold the pieces.**

- $$83 \times 2 = (80 \times 2) + (3 \times 2) = \quad + \quad =$$

- $$64 \times 9 = (\quad \times 9) + (\quad \times 9) = \quad + \quad = \quad$$

$47 \times 6 =$

$38 \times 4 =$

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Take out easy chunks of the divisor until nothing is left. **Keep count** as you go.

- Chunk 1: 20 fours = 80. Left over: $96 - 80 =$

Chunk 2: fours = . Left over: 0

Total fours: $20 + \quad = \quad$ so $96 \div 4 = \quad$

- Chunk 1: 10 twelves = . Left over: $156 -$ =

Chunk 2: twelves = . Left over: 0

$$156 \div 12 = \underline{\hspace{2cm}}$$

$84 \div 6 =$

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