

Patterns Involving Nines

There are several patterns that involve nine. The following activities will assist you in discovering some of these patterns. Use your calculator to do the activities.

1. What happens when you divide a number by 9? 99? 999?

Example: $3 \div 9 = \underline{\hspace{2cm}}$

$3 \div 99 = \underline{\hspace{2cm}}$

$3 \div 999 = \underline{\hspace{2cm}}$

What seems to be happening?

2. Check the pattern by trying several one-digit numbers and recording what you find.

One-Digit Number	Divide by 9	Divide by 99	Divide by 999

Describe the final pattern that you discovered.

3. Will your pattern hold for two-digit numbers?

Try some two-digit numbers in the table below to check the pattern.

Two-Digit Number	Divide by 9	Divide by 99	Divide by 999

Now, describe the pattern now for two-digit numbers.

4. Now, let's look at fractions with 9 in the denominator and a one-digit number in the numerator.

$$\frac{1}{9} \quad \frac{2}{9} \quad \frac{3}{9} \quad \frac{4}{9} \quad \frac{5}{9} \quad \frac{6}{9} \quad \frac{7}{9} \quad \frac{8}{9}$$

What is the decimal representation for each fraction?

Describe the pattern.