

## Last Digits

Number	Last Digit
$2^1$	2
$2^2$	4
$2^3$	8
$2^4 = 16$	6
$2^5 = 32$	2
$2^6 = 64$	4
$2^7 = 128$	8
$2^8 = 256$	6
$2^9 = 512$	2
$2^{10} = 1024$	4

What is the pattern here?

What is the last digit of  $2^{400}$ ?

What does this have to do with the division algorithm?

What is the last digit of  $3^{987}$ ?

## Divisibility

What is the remainder when you divide 10 by 9? 100 by 9? 1000 by 9? ...

What is the remainder when you divide  $8 \cdot 1,000,000$  by 9?  $6 \cdot 100,000$ ?  $7 \cdot 10,000$ ? ...

What is the remainder when you divide

$$8 \cdot 1,000,000 + 6 \cdot 100,000 + 7 \cdot 10,000 + \dots = 8675309$$

by 9?

What about dividing by 3? By 11?

What happens when you try this sort of “trick” with 2? With 5? With 4?

What happens when you try this sort of “trick” with 7?!?