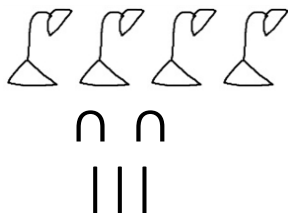


Egyptian Mathematics (Addition)

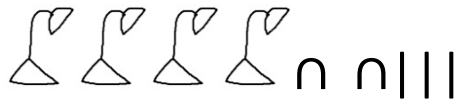
The ancient Egyptians wrote numbers using symbols, or hieroglyphics. The symbols for numbers are shown in the table below.

Number	Symbol	Description
1		Vertical stroke
10	∩	Heel bone
100	☉	Scroll
1000	🌸	Lotus flower
10,000	☞	Pointing finger
100,000	🐟	fish
1,000,000	🧎	Kneeling person

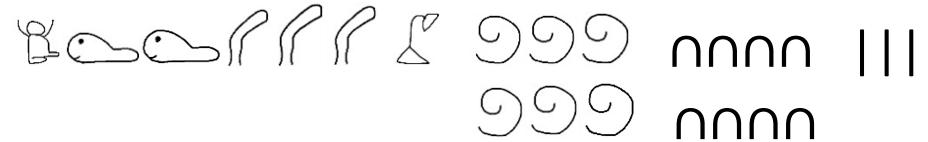
To write a number in ancient Egyptian symbols, you write down the right number of symbols. For example, $4,023 = 4$ thousands, 2 tens, and 3 ones:



Or, we could write it all in a row instead of up and down.



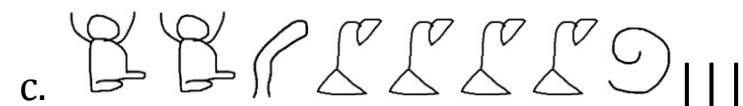
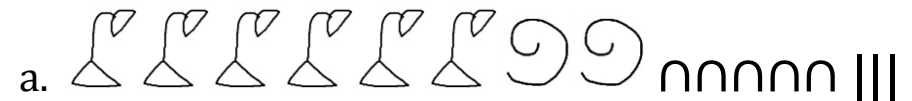
We could write 1,231,683 as 1 million, 2 hundred thousand, 3 ten thousands, 1 thousand, 6 hundreds, 8 tens, and 3 ones.



1. Write each of these numbers in ancient Egyptian symbols.

- 529
- 63
- 4,401
- 2,003,251

2. What number is represented by the symbols?



Use the table of Egyptian numbers from the other side as you need it.

Addition and subtraction in ancient Egyptian symbols are similar to what they are in our numerical system.

$$\begin{array}{r}
 \text{𐍎} \quad \text{𐍐𐍐𐍐} \quad \text{||||} \\
 + \text{𐍎} \text{𐍎} \text{𐍐𐍐𐍐𐍐} \text{𐍎} \text{𐍎} \text{ |} \\
 \hline
 \text{𐍎} \text{𐍎} \text{𐍎} \text{𐍐𐍐𐍐𐍐𐍐𐍐} \text{𐍎} \text{𐍎} \text{ ||||}
 \end{array}$$

Sometimes you have to regroup. For example,

$$\begin{array}{r}
 \text{𐍐𐍐𐍐𐍐} \quad \text{𐍎} \text{ |||||} \\
 + \text{𐍐𐍐𐍐𐍐} \text{𐍎} \text{ |||} \\
 \hline
 \text{𐍐𐍐𐍐𐍐𐍐𐍐𐍐𐍐} \text{𐍎} \text{𐍎} \text{ |||||} \\
 \text{|||||}
 \end{array}$$

The answer is 11 hundreds, 3 tens, and 12 ones. Instead of 12 ones, we want to say that we have 1 ten and 2 ones. We also want to call the 11 hundreds 1 thousand and 1 hundred. We regroup ten of the 𐍐 and ten of the | to see that the answer really is 𐍎𐍐𐍎𐍎𐍎 | | .

Practice ancient Egyptian addition. Regroup if necessary.

$$\begin{array}{r}
 1. \quad \text{𐍐𐍐𐍐} \text{𐍎} \text{ |||} \\
 + \quad \text{𐍐} \text{𐍎} \text{𐍎} \text{ ||||} \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 2. \quad \text{𐍎} \text{𐍎} \text{ |||} \\
 + \text{𐍎} \text{𐍐𐍐} \text{𐍎} \text{ ||} \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 3. \quad \text{𐍐𐍐𐍐𐍐} \text{𐍎} \text{𐍎} \text{𐍎} \text{ ||} \\
 + \quad \text{𐍐𐍐} \text{𐍎} \text{𐍎} \text{ ||||} \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 4. \quad \text{𐍎} \text{𐍐} \text{𐍎} \text{𐍎} \text{ |||||} \\
 + \text{𐍎} \text{𐍎} \text{𐍎} \text{𐍐} \text{𐍎} \text{ ||||} \\
 \hline
 \end{array}$$

5. Rewrite problems 1-4 and their sum in our number system.

6. Write a sentence explaining how the ancient Egyptian regrouping is similar to carrying in our arithmetic.

Egyptian Mathematics (Subtraction)

Review: The symbols for numbers in ancient Egyptian arithmetic are shown in the table below.

Number	Symbol	Description
1		Vertical stroke
10	∩	Heel bone
100	☉	Scroll
1000	🪷	Lotus flower
10,000	👉	Pointing finger
100,000	🐟	fish
1,000,000	🧎	Kneeling person

Subtraction in ancient Egyptian symbols is just about tracking the symbols that are written. For example, you can often just erase the symbols that get subtracted.

$$\begin{array}{r}
 \text{🪷🪷🪷🪷🪷☉∩∩∩} \quad ||||| \\
 - \text{🪷🪷🪷🪷∩} \quad || \\
 \hline
 \text{🪷☉∩∩} \quad |||||
 \end{array}$$

If you don't have enough symbols to erase, though, you may have to regroup.

$$\begin{array}{r}
 \text{🪷🪷🪷☉☉∩∩} \quad | \\
 - \text{🪷🪷☉∩} \quad ||| \\
 \hline
 \end{array}$$

There aren't enough one's, so regroup by writing ∩ as ||||| and finish the subtraction.

$$\begin{array}{r}
 \text{🪷🪷🪷☉☉∩} \quad ||||| \\
 - \text{🪷🪷☉∩} \quad ||| \\
 \hline
 \text{🪷☉} \quad |||||
 \end{array}$$

Practice subtracting in ancient Egyptian symbols, regrouping when needed.

$$1. \begin{array}{r} \text{𐍎𐍎𐍎𐍎} \text{ |||||} \\ - \quad \text{𐍎𐍎} \text{ |} \\ \hline \end{array}$$

$$2. \begin{array}{r} \text{𐍎} \text{ 𐍑𐍑𐍑𐍑𐍑} \text{ 𐍎𐍎𐍎} \text{ |||} \\ - \quad \quad \text{𐍑𐍑𐍑𐍑} \text{ 𐍎𐍎} \text{ |} \\ \hline \end{array}$$

$$3. \begin{array}{r} \text{𐍎} \text{ 𐍑𐍑𐍑𐍑𐍑} \text{ 𐍎𐍎𐍎} \text{ |||} \\ - \text{ 𐍑𐍑𐍑𐍑𐍑𐍑𐍑𐍑} \text{ ||} \\ \hline \end{array}$$

$$4. \begin{array}{r} \text{𐍎} \text{ 𐍎} \text{ 𐍑𐍑𐍑𐍑𐍑𐍑𐍑𐍑} \text{ 𐍎} \text{ |||} \\ - \text{ 𐍎} \text{ 𐍑𐍑𐍑𐍑} \text{ 𐍎𐍎𐍎𐍎𐍎𐍎} \text{ ||||} \\ \hline \end{array}$$

Compare Rewrite each subtraction problem in our number system.

1.

2.

3.

4.

Write 1-2 sentences describing the similarities and differences between ancient Egyptian subtraction and modern subtraction.