🏛️ The Babylonian Numeral System

Journey to Ancient Mesopotamia — 3300 BCE

Name: _____ Date: _____

Part 1: Time Travel Challenge

🕰️ Imagine...

You've traveled back 5,300 years to ancient Mesopotamia (modern-day Iraq). There are no calculators, no computers, and no numbers like 0, 1, 2, 3... You need to count your sheep and trade goods. How will you write numbers?

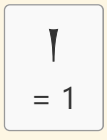
Fill in the blanks about how Babylonians wrote:

1. Paper hadn't been invented yet! Babylonians wrote on soft, wet _____.
2. They used a reed stick called a _____ to press marks into the clay.
3. The wedge-shaped marks they made are called _____ (from Latin "cuneus" = wedge).
4. After writing, they let the clay dry in the _____ to make it permanent.

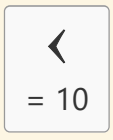
Part 2: Meet the Symbols

The Babylonians only needed **TWO symbols** to write any number!

The Two Cuneiform Number Symbols



Vertical wedge (press stylus straight down)



Horizontal wedge (press stylus at an angle)

How would you write these numbers using wedges? (Use "V" for vertical wedge worth 1, "H" for horizontal wedge worth 10)

5. 3 = _____ *(Hint: How many vertical wedges?)*

6. 7 = _____

7. 10 = _____

8. 23 = _____ *(Hint: How many 10s plus how many 1s?)*

9. 45 = _____

10. 59 = _____ *(This is the largest number in one place!)*

Part 3: The Base-60 System

Our number system is **base-10** (we carry to the next place at 10).
The Babylonian system was **base-60** (they carried to the next place at 60)!

📊 Place Value Comparison

Place	Our Base-10	Babylonian Base-60
First place	1 (10^0)	1 (60^0)
Second place	10 (10^1)	60 (60^1)
Third place	100 (10^2)	3,600 (60^2)

Calculate these Babylonian numbers (places separated by |):

11. Babylonian: 1 | 12 → (1 × 60) + (12 × 1) = _____ + _____ = _____

12. Babylonian: 2 | 30 → (_____ × 60) + (_____ × 1) = _____ + _____ = _____

13. Babylonian: 1 | 0 | 0 → (1 × 3600) + (0 × 60) + (0 × 1) = _____

14. Babylonian: 1 | 30 | 15 → (_____ × 3600) + (_____ × 60) + (_____ × 1) = _____

Now convert OUR numbers to Babylonian notation:

15. 90 = _____ | _____ *(Hint: 90 ÷ 60 = 1 remainder 30)*

16. 125 = _____ | _____ *(Hint: 125 ÷ 60 = ?)*

17. 3660 = _____ | _____ | _____ *(Hint: Start with 3660 ÷ 3600)*

Part 4: The Zero Problem

🤔 **Think About It...**

Early Babylonians had **NO symbol for zero**! They used spacing to show empty places.

18. Why is zero important as a placeholder? Look at these numbers:
In our system: 35 vs 305 vs 350
Without zeros, how would you tell them apart? _____

19. What could go wrong if a Babylonian scribe was sloppy with spacing?

_____

Part 5: Why Base-60 Was Brilliant

The number 60 has MANY factors (numbers that divide into it evenly):

Factors of 10: 1, 2, 5, 10 (only 4 factors)

Factors of 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 (12 factors!)

This made fractions much easier! Complete the table:

Fraction	In Base-10 (decimal)	In Base-60 (as sixtieths)
½	0.5	30/60 = _____ sixtieths
⅓	0.333... (repeating!)	20/60 = _____ sixtieths
¼	0.25	_____ /60 = _____ sixtieths
⅕	0.2	_____ /60 = _____ sixtieths
⅙	0.1666... (repeating!)	_____ /60 = _____ sixtieths

20. Which system makes ⅓ easier to work with? BASE-10 / BASE-60

21. Why do you think Babylonian mathematicians and astronomers loved base-60?

_____

Part 6: The Living Legacy — What We Still Use Today!

> ⏰ **You Use Base-60 Every Day!**
>
> The Babylonian system is over 5,000 years old, but we STILL use it!

Fill in the blanks with numbers from the Babylonian system:

22. There are _____ seconds in a minute.

23. There are _____ minutes in an hour.

24. There are _____ degrees in a circle. *(Hint: 6 × 60)*

25. When you look at a clock, check a map, or measure an angle, you are using math invented by the _____ over _____ years ago!

Part 7: System Comparison

Complete this comparison table:

Feature	Our Base-10 System	Babylonian Base-60
Base Number	10	_____
Core Symbols	0, 1, 2, 3, 4, 5, 6, 7, 8, 9	Vertical wedge (_____) and Horizontal wedge (_____)
Did they have zero?	Yes	_____ (placeholder only, added later)
Place value system?	Yes	_____
Writing direction	Left to right	_____
Main strength	Easy to learn (10 fingers)	_____
Main challenge	Large numbers need many digits	_____

Part 8: Challenge Problems

🎯 Babylonian Addition

Add these Babylonian numbers. Remember: when a place reaches 60 or more, carry to the next place!

26. 45 + 28 = _____ → In Babylonian: _____ | _____ *(Hint: 45 + 28 = 73, and 73 = 1×60 + 13)*

27. 52 + 35 = _____ → In Babylonian: _____ | _____

28. A Babylonian astronomer wrote: 2 | 15 | 30
What is this number in our system? _____ *(Hint: 2×3600 + 15×60 + 30×1)*

Part 9: Reflection

📝 Think and Write

29. What surprised you most about the Babylonian number system?

_____

_____

30. If you could ask a Babylonian mathematician one question, what would it be?

_____

_____

⭐ Key Takeaway

Ancient mathematicians were brilliant problem-solvers!

The Babylonians created a sophisticated number system using just two symbols. Their base-60 system was so useful for astronomy and timekeeping that we still use it today — every time you check the time or measure an angle, you're using 5,000-year-old Babylonian math!