INTRODUCTION

ENGLISH IS STUPID

Far too many decades ago, I was sitting in a junior-high Spanish class. The topic of the hour was the conjugation of verbs, but one of them didn't follow the standard rules. This bothered my budding mathematical sensibilities, which required that all things follow well-regulated patterns. I asked the teacher why this word was different, and she simply responded "That's just the way it is," to which I replied, "Well, Spanish is stupid."

As her face turned red, I immediately realized my mistake. She was upset for a variety of good reasons, one of which was the comment that came from me. I was president of the Spanish club. This "club" was her euphemism for her detention hour where she sent students who didn't do their homework. I was president merely because I had logged in the most hours that year. She was also upset because no one likes some smart-aleck preteen to dismiss their life's work in a few words. But I suspect what bothered her most was my comment itself, which was, in fact, stupid.

She then began a long rant, not directed at me, but rather at the English language. She proceeded to list every English inconsistency that popped in her head. Consider the plural nouns "dogs," "mice," and "oxen." Can you see any consistent rule for pluralization? Now consider verb conjugations. The present-past tense pairs "am"/"was," "run"/"ran," and "eat"/"ate" have no pattern whatsoever. The spellings of the English language are even worse. English is consistently inconsistent. In retrospect, I can't even imagine how I learned the language. I suspect it would have been easier to invent a time machine, go back into the past, maim Daniel Webster, and leave a threatening note to any dictionary-writer wannabes to make their choices more carefully. As my teacher rightly pointed out, anyone who speaks English can't possibly criticize Spanish for its relatively few aberrations.

Fortunately, all horrible things have to come to an end, and the bell rang signaling the conclusion of class. I slipped out desperately trying to avoid eye contact with the teacher. Before the next meeting of Spanish club, I had nothing left to do but reflect on my experience. I learned two important lessons that day. The first is to think before you speak. The second is that it's very easy to perceive flaws in a system that's alien to your experience. At the same time, it's very difficult to give it a fair evaluation of your own, because familiarity often leaves us blind to our systems' limitations.

Egyptian mathematics has an alien feel to it. Most math historians refer to it as primitive or awkward. Even worse, many simply ignore it except for a passing reference. They look at this system and feel uncomfortable because it's so different. They perceive apparent "flaws" and move on. They don't understand Egyptian mathematics simply because they don't do it enough to truly appreciate it. To someone who's mastered it, Egyptian mathematics is beautiful. It scorns memorization and rote algorithms while it favors insight and creativity. Each problem is a puzzle that can be solved in many ways. Frequently, solutions will be surprising, something that never happens in the step-by-step drudgery that is modern computation.

There are a number of good reasons to learn Egyptian mathematics. Puzzle lovers will find it fun and challenging. History lovers will gain a new insight into the Egyptian mind-set. However, I believe the most important reason to study Egyptian mathematics is because it so different. We're taught throughout our entire education

that math simply is. We learn laws and memorize steps, never questioning what is laid out before us, for if math is "fact," how could mathematics be wrong? When you're exposed to a different system, you're forced to reconsider the immutability of "the math."

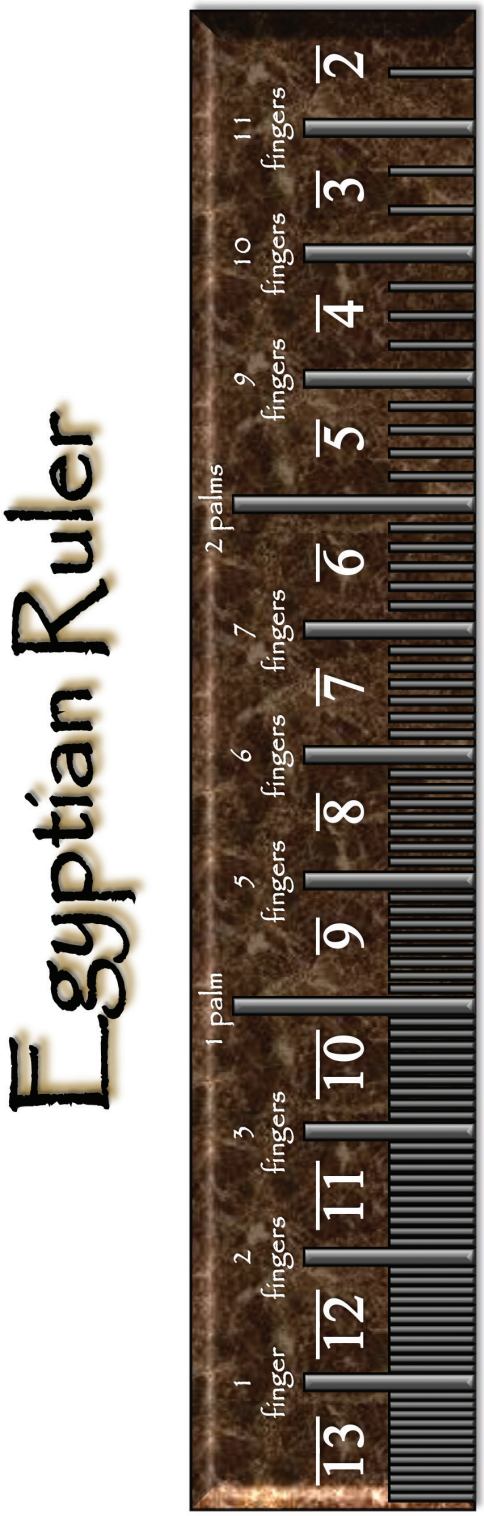
Let's go back to the foreign language analogy. Ask an eight-year-old to conjugate a verb, describe a gerund, or identify the tense of a sentence, and they'll give you a blank stare. Yet they can speak as clearly as you or I. They've memorized their language system to the point where they don't need to understand what they're doing as they talk. It's only when they take a foreign language that they're forced to think consciously about language itself. Note that many years ago, I didn't even realize that language wasn't, could be, or should be consistent. It was only being exposed to a new one that forced me out of my comfort zone. In the same way, I believe, Egyptian mathematics shines a light on modern mathematics, providing insight into what we do and why we do it.

In fact, this book is a thinly disguised critique of modern mathematics. In the next-to-last chapter, I'll teach you Babylonian computation, the precursor to our system. Then I'll follow that chapter with a battle royal between the Egyptian and our modern system. We will consider which system is better and what exactly "better" means.

Despite some of my loftier goals, I've tried to make this book fun. I've included stories, analogies, and jokes in an attempt to bring the subject alive. I hope to show you mathematics within the context of the Egyptian world and not removed from it using the needless abstraction of most math books. The historical background is intentionally light, provided more for color than for substance. When possible, I've used historical context that motivates or helps explain the mathematics included. In some sections where there are no obvious connections, I have still included background material to maintain the tone of the book, going as far as using episodes in history as metaphors for mathematical ideas.

If you ask first-graders, "What's your favorite subject?" the vast majority will respond, "Math." The joy of mathematics has to be beaten out of us by endless drills and subjugation to seemingly arbitrary rules. Perhaps, by starting over, this time with Egyptian mathematics, you'll get a fresh chance to revive some of the delight you felt as a child. It's time to get back in touch with the math nerd in us all.

You can print the ruler and charts from the Website for the book (http://press.princeton.edu/titles/10197.html).



Tables

×2 ÷(2+1)
9 18 = 6
×n ÷(n+1)

10	100	1000
𓎆	𓍢	𓆼
10,000	**100,000**	**1,000,000**
𓂭	𓆐	𓁨

Sum	Ans.
6 6 6	2
25 15 75 200	8
50 30 150 400	16
25 50 150	15
7 14 28	4

Sum	Ans.
14 21 42	7
18 27 54	9
22 33 66	11
28 49 196	13
30 45 90	15

1 cubit = 7 palms
1 palm = 4 fingers
1 hekat = 320 ro

n	n/10
1	10
2	5
3	5 10
4	3 15
5	2
6	2 10
7	3 30
8	3 10 30
9	3 5 30
3	15

3 Identities
2 6 = 3
3 3 = 1
2 × 3 = 1 3
3 × 3 = 3 9

2 × odd = table look up ↓

n	2n
3	3
5	3 15
7	4 28
9	6 18
11	6 66
13	8 52 104
15	10 30
17	12 51 68
19	12 76 114
21	14 42
23	12 276
25	15 75
27	18 54
29	24 58 174 232
31	20 124 155
33	22 66
35	30 42
37	24 111 296
39	26 78
41	24 246 328
43	42 86 129 301
45	30 90
47	30 141 470
49	28 196
51	34 102

2 × even = half : 2 × 12 = 6

n	2n
53	30 318 795
55	30 330
57	38 114
59	36 236 531
61	40 244 488 610
63	42 126
65	39 195
67	40 335 536
69	46 138
71	40 568 710
73	60 219 292 365
75	50 150
77	44 308
79	60 237 316 790
81	54 162
83	60 332 415 498
85	51 255
87	58 174
89	60 356 534 890
91	70 130
93	62 186
95	60 380 570
97	56 697 776
99	66 198
101	101 202 303 606