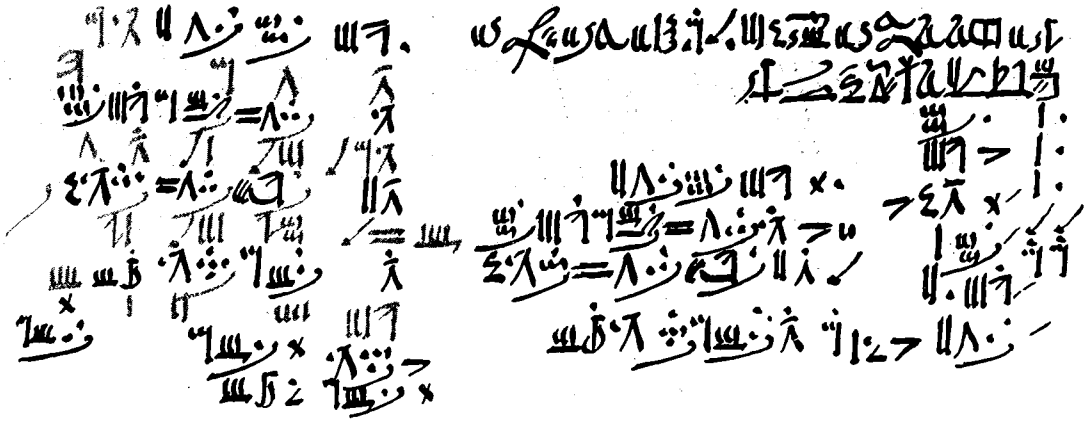
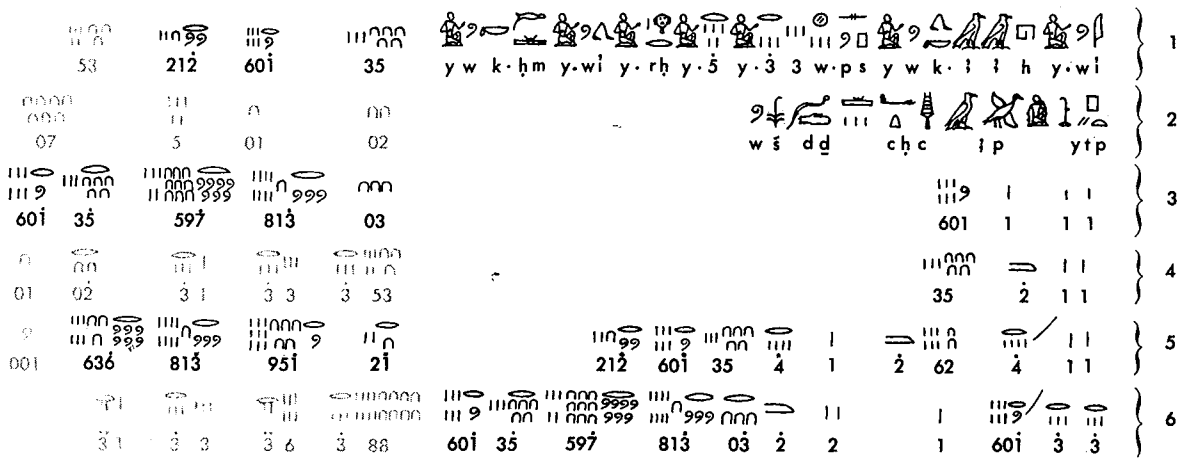




iw · y ḥ ḥ · kwy sp · w 3 3 · y 5 · y ḫr · y iw · y mḥ · kwy pty p; ‘ḥ‘ dd šw

Go down I times 3, ⅓ of me, ⅕ of me is added to me; return I, filled am I. What is the quantity saying it?

1	1
1	1
1	1
3	3
5	5

1	106
2	53
\ 4	26 2
\ 106	1
\ 53	2
\ 212	2
dmd	1
Total	

1	4	53	106	212
2	2	30	318	795 53 106
3	12	159	318	636
5	20	265	530	1060

53		106	212			
20		10	5		35	
30		318	795	53	106	
35	3	3 3	1 3	20	10	70
12		159	318	636		
88	3	6 3	3 3	1 3	100	
20		265	530	1060		
53		4	2	1	80	
				4	265	

2	530
4	265
4	265
dmd	1060
Total	

Problem 36 of the papyrus begins: "Go down I times 3, ⅓ of me, ⅕ of me is added to me; return I, filled am I. What is the quantity saying it?" The problem is then solved by the Egyptian method. On these pages is a facsimile of the problem as it appears in the papyrus. The hieratic script reads from right to left. The characters are reproduced in gray and black (the original papyrus was written in red and black). In the middle of the page is a rendering in hieroglyphic script, which also reads from right to left. Beneath each line of hieroglyphs is a phonetic translation. The numbers are given in Arabic with the Egyptian notation. Each line of hieroglyphs and its translation is numbered to correspond to a line of the hieratic. At the bottom of the page the phonetic and numerical translation has been reversed to read from left to right. Beneath each phonetic expression is its English translation. A dot above a number indicates that it is a fraction with a numerator of one. Two dots above a 3 represent ⅔, the only Egyptian fraction with a numerator of more than one.

Readers who have the desire to trace the entire solution are cautioned that the scribe made several mistakes that are preserved in the various translations.

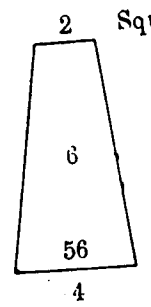
3. Problem No. 14 of the Moscow Papyrus*

BATTISCOMBE GUNN
T. ERIC PEET

Problem No. 14.

(Transcription, Pl. xxxvi.)

Example of calculating a truncated pyramid.
If you are told: A truncated pyramid of 6 for the vertical height by 4 on the base by 2 on the top:
You are to square this 4; result 16. You are to double 4; result 8. You are to square this 2; result 4. You are to add the 16 and the 8 and the 4; result 28. You are to take ⅓ of 6; result 2. You are to take 28 twice; result 56.
See, it is of 56.
You will find (it) right.



Squared 4

1 28
⅓ 2
2 56

1 4
2 8

Squared, 16

Total 28

NOTES ON THE TEXT

The text is well preserved and presents no difficulties.

Figure. The solid is of course represented, as in the hieratic ideogram, as a simple trapezoid, and in the original is roughly drawn without regard to the proportions, as in the transcription.

COMMENTARY

The problem is to determine the volume of what we call a truncated pyramid, or frustum of a pyramid, the *data* being the vertical height (*stwti*) and the respective lengths of the sides of the two squares which bound the solid below and above.

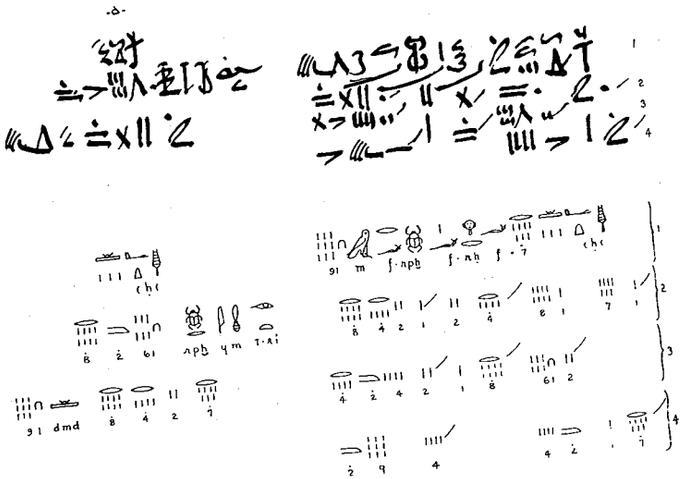
*Source: From Henrietta O. Midonick (ed.), *The Treasury of Mathematics* (1965), 520-521. Reprinted by permission of the Philosophical Library.

1.D Egyptian Mathematics

For a literate civilization extending over some 4000 years, that of the ancient Egyptians has left disappointingly little evidence of its mathematical attainments. Even though the classical Greeks believed mathematics to have been invented in Egypt (1.D4)—though their accounts are far from unanimous on how this happened—there are now but a handful of papyri and other objects to convey a sense of Egyptian mathematical activity. The largest and best preserved of these is the Rhind papyrus (1.D1, 1.D2), now in the British Museum, a copy made in about 1650 BC of a text from two centuries earlier. A lively picture of one of the contexts in which mathematics was used is provided by a satirical letter (1.D3) from later that millennium (perhaps 1500–1200 BC); the writer adopts a jocular attitude towards his colleague's attempts at quantity surveying. 1.D5–1.D7 are modern commentaries. In 1.D5 the Egyptologist Sir Alan Gardiner explains an initially puzzling feature of Egyptian arithmetic, the Egyptian concept of fraction or part. 1.D6 and 1.D7 are contrasting perceptions of Egyptian mathematics, from the translator of the Rhind papyrus and from a historian of mathematics.

1.D1 Two problems from the Rhind papyrus

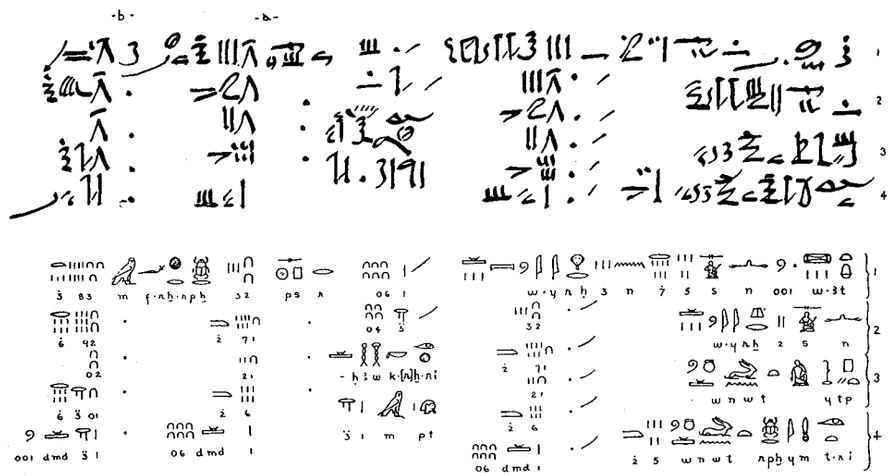
(*a*) *Problem 24*



1	8
\2	16
2̇	4
\4̇	2
\8̇	1
\1	2 4̇ 8̇
\2	4 2̇ 4
\4	9 2̇

ỉr·t my ḫpr
The doing as it occurs.
'ḥ' 16 2̇ 8̇
The quantity
7̇ 2 4̇ 8̇
dmd 19.
Total

(*b*) *Problem 40*



t;·w 100 n s 5 7̇ n 3 ḥry·w n s 2 ḥry·w pty twnw
Loaves 100 for man 5, $\frac{1}{7}$ of the 3 above to man 2 those below. What is the difference of share?

ỉr·t	my	ḫpr	twnw	5 2̇	ir·ḫ[r]·k
The doing as it occurs. The difference of share being 5 $\frac{1}{2}$,					Make thou the
\1	23				
\1	17 2̇				
\1	12				
\1	6 2̇				
\1	1				
dmd	60				
Total					

w;ḥ–tp m 1 3̈
multiplication: $1\frac{2}{3}$

r sp 23	ḫpr·ḫr·f m	38 3̇	
up to times	becomes it:		
"	17 2̇	"	29 6̇
"	12	"	20
"	6 2̇	"	10 3̈ 6̇
"	1	"	1 3̈
dmd	60	dmd	100.
Total		Total	