4.1 EXERCISES

Convert each Egyptian numeral to Hindu-Arabic form.

- 3. XXXX CCC (11 9999 ∩∩ ||||| XXX CCC (11 9999 ∩∩ |||||

- 2. 2. 2. 9999∩11
- 4. XXX £ 5 590001

Convert each Hindu-Arabic numeral to Egyptian form.

5. 23,145 **6.** 427 **7.** 8,657,000 **8.** 306,090

22. 2416

Chapter 1 of the book of Numbers in the Bible describes a census of the draft-eligible men of Israel after Moses led them out of Egypt into the Desert of Sinai, about 1450 B.C. Write an Egyptian numeral for the number of available men from each tribe listed.

9.	59,300 from the tribe of Simeon	10.	46,500 from the tribe of Reuben
11.	74,600 from the tribe of Judah	12.	45,650 from the tribe of Gad
13.	62,700 from the tribe of Dan	14.	54,400 from the tribe of Issachar

Convert each Chinese numeral to Hindu-Arabic form.

20. 63

19. 960

15. h	16. \succ	17. 戻	18. 🖸
百	百	Ŧ	Ŧ
(F)	5	案	h
+	+	ť	百
Ь	六	-	零
			7
Convert each Hind	du-Arabic numeral to Chinese.		

Though Chinese art forms began before written history, their highest development was achieved during four particular dynasties. Write traditional Chinese numerals for the beginning and ending dates of each dynasty listed.

21. 7012

23.	Ming (1368 to 1644)	24 . Sung (960 to 1279)
25.	T'ang (618 to 907)	26. Han (202 B.C. to A.D. 220)

Work each of the following addition or subtraction problems, using regrouping as necessary. Convert each answer to Hindu-Arabic form.

27. 9 ∩∩ II + ∩∩∩∩IIII 	28. 99∩∩∩ + 9∩∩∩ ∩∩	29. <i>ℓℓℓ ⊈ ⊈</i> ∩ III + <i>ℓℓ ⊈</i> 99 ∩∩∩∩IIII 29. 100 000000000000000000000000000000000
30.	31. ११∩∩∩।।।। <u>- १ ∩∩ ।</u>	32. ∩∩∩III ∩∩ III <u>−∩∩∩IIII</u>
33. ℓ ≰ 991111 - ⊈⊄⊄ 999111 - ≰×× 999111	34. ≰ 999 ∩∩∩ - 99 ∩∩∩ _ 99 ∩∩∩∩	

Use the Egyptian algorithm to find each product.

35. 26 × 53	36. 33 × 81	37. 58×103	38. 67 × 115
--------------------	--------------------	----------------------------	---------------------

Convert all numbers in the following problems to Egyptian numerals. Multiply using the Egyptian algorithm, and add using the Egyptian symbols. Give the final answer using a Hindu-Arabic numeral.

- 39. Value of a Biblical Treasure The book of Ezra in the Bible describes the return of the exiles to Jerusalem. When they rebuilt the temple, the King of Persia gave them the following items: thirty golden basins, a thousand silver basins, four hundred ten silver bowls, and thirty golden bowls. Find the total value of this treasure, if each gold basin is worth 3000 shekels, each silver basin is worth 500 shekels, each silver bowl is worth 50 shekels, and each golden bowl is worth 400 shekels.
- 40. Total Bill for King Solomon King Solomon told the King of Tyre (now Lebanon) that Solomon needed the best cedar for his temple, and that he would "pay you for your men whatever sum you fix." Find the total bill to Solomon if the King of Tyre used the following numbers of men: 5500 tree cutters at two shekels per week each, for a total of seven weeks; 4600 sawers of wood at three shekels per week each, 4600 sawers of wood at the sheet for a total of 32 weeks; and 900 sailors at one shekel for a total of 32 weeks; and 900 sailors at one shekel The Hindu-Arabic system is positional and uses ten as

$^{st\!0}$ Explain why each of the following steps would be an improvement in the development of numeration systems.

- 41. progressing from carrying groups of pebbles to making tally marks on a stick
- 42. progressing from tallying to simple grouping

- 43. progressing from simple grouping to multiplicative grouping
- 44. progressing from multiplicative grouping to positional numeration

Recall that the ancient Egyptian system described in this section was simple grouping, used a base of ten, and contained seven distinct symbols. The largest number expressible in that system is 9,999,999. Identify the largest number expressible in each of the following simple grouping systems. (In Exercises 49–52, d can be any counting number.)

- **45.** base ten, five distinct symbols
- **46.** base ten, ten distinct symbols
- **47.** base five, five distinct symbols
- **48.** base five, ten distinct symbols
- **49.** base ten, *d* distinct symbols
- **50.** base five, *d* distinct symbols
- **51.** base seven, *d* distinct symbols
- **52.** base b, d distinct symbols (where b is any counting number 2 or greater)
- the base. Describe any advantages or disadvantages that may have resulted in each of the following cases.
- 53. Suppose the base had been larger, say twelve or twenty for example.
- 54. Suppose the base had been smaller, maybe eight or five.