CHAPTER 4 TEST

1. For the numeral $\left| \underbrace{ \left\{ \begin{array}{c} & & \\$

ation system, and give the Hindu-Arabic equivalent.

2. Simplify:

 $(8 \times 10^3) + (3 \times 10^2) + (6 \times 10^1) + (4 \times 10^0).$

3. Write in expanded notation: 60,923.

Perform each operation using the alternative algorithm specified.

- 4. 37×54 (Russian peasant or Egyptian method)
- **5.** 236×94 (Lattice method)
- 6. 21,325 8498 (Nines complement method)

Convert each of the following to base ten.

7. 424 _{five}	8. 100110 _{two}	9. $A80C_{sixteen}$
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Convert as indicated.

- **10.** 58 to base two
- **11.** 1846 to base five
- **12.** 10101110_{two} to base eight
- 13. $B52_{sixteen}$ to base two

Briefly explain each of the following.

- **14.** the advantage of multiplicative grouping over simple grouping
- **15.** the advantage, in a positional numeration system, of a smaller base over a larger base
- **16.** the advantage, in a positional numeration system, of a larger base over a smaller base

Answer the questions in Exercises 17–19.

- **17.** For addition of whole numbers, what is the identity element?
- **18.** For multiplication of rational numbers, what is the inverse of 3?
- **19.** For any whole numbers a, b, and c, (a + b) + c = (b + a) + c. What property does this illustrate?
- **20.** Describe in general what constitutes a mathematical *group*.

A mathematical system with the operation V is defined by the table here.

V	a	е	i	0	и
а	0	е	и	а	i
е	и	0	а	е	i
i	e	и	0	i	а
0	a	е	i	0	и
и	i	а	е	и	0

- **21.** (a) Is there an identity element in this system?
 - (**b**) If so, what is it?
- 22. (a) Is closure satisfied by this system?
 - 🌂 (**b**) Explain.
- 23. (a) Is this system commutative?
 - 🖄 (b) Explain.
- **24. (a)** Is the distributive property satisfied in this system?
 - ^𝔨(**b**) Explain. 𝔅
- **25.** (a) Is the system with the operation V a group?
 - 🌯 (**b**) Explain.