Math 102: Chapter 4 Supplementary Exercises

1. Convert each numeral to Hindu-Arabic.

   (a) 

   (b) MCMLIX

   (c) $\overline{\text{MDCXXIX}}$CDXLVIII

   (d) $\overline{\text{MMMCMXCIX}}$DCCXCIV

   (e) $\iota\tau\iota\iota\alpha\omega\nu\beta$

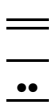
   (f) $\iota\chi\iota\pi\iota\gamma\psi\lambda\epsilon$

   (g) 

   (h) 

   (i) 

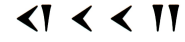
   (j) 

   (k) 

   (l) 

   (m) 

   (n) 

   (o) 

2. Convert each Hindu-Arabic numeral to the indicated numeration system.

   (a) 2,010 to Egyptian (E), Roman (R), Chinese (C), Greek (G), Babylonian (B), and Mayan (M).

   (b) 4,849 to E, R, C, G, B, M

   (c) 10,000 to E, R, G, B, M

   (d) 69,995 to E, R, G, B, M

   (e) 100,000 to E, R, G, B, M

   (f) 702,555 to E, R, G, B, M

   (g) 1,000,000 to E, R, B, M

   (h) 3,850,384 to E, R, B, M

   (i) 4,000,010 to E, B, M

3. Convert each to base-10.

   (a) $5FC7A_{16}$
   (b) $BABAA_{12}$
   (c) 2101210201_3
   (d) 3401243_5
   (e) 1001001111_4

4. Convert each to the indicated base.

   (a) 1,000,000 to base-12
   (b) 250,765 to base-7
   (c) 38,293 to base-16
   (d) 951 to base-3
   (e) 34,706,083 to base-16
   (f) 306,888 to base-6

5. Convert each to base-10.

   (a) 73.4_8
   (b) $A5.E8_{16}$
   (c) 1001011.101_2
   (d) $0.00AA_{12}$
   (e) 2.45_6

6. Convert each to the indicated base.

   (a) 2.5 to base-2 fraction & radix forms.
   (b) 100.35 to base-5 fraction & radix forms.
   (c) 2/3 to base-6 & base-9 radix forms.
   (d) 26/49 to base-7 radix form.
   (e) 139/144 to base-12 radix form.
   (f) 19.125 to base-2, -4, -8, & -16 radix forms.
   (g) 0.56 to base-5 radix form.

7. Convert directly to the base indicated.

   (a) $11011101010111000011010101010111110_2$ to base-16.
   (b) 111.00110111_2 to base-16.
   (c) $ABCDEF_{16}$ to base-2.
   (d) $7D.1F_{16}$ to base-2.

8. Determine the base-2 radix form for 3.14 (the first three digits of pi) out to the 2^{-9} place value.

9. A full-fledged base-60 (sexagesimal) numeration system would have numerals for all numbers from 0 to 59. One easy way to assign numerals to these numbers is to let $d_0 = 0$, $d_1 = 1$, $d_2 = 2, \ldots, d_{58} = 58$, $d_{59} = 59$. With this scheme in mind, convert the numeral $d_7 d_{41} d_{28}$ to base-10, and convert 152,373 to base-60.

10. Carry out the long division in the base indicated.
    (a) $403_7 \div 6_7$ (quotient has repeating digit)
    (b) $2404_5 \div 44_5$ (quotient has repeating digit)
    (c) $4233_8 \div 23_8$ (carry out to 8^{-3} place)
    (d) $2340_5 \div 34_5$ (carry out to 5^{-3} place)
    (e) $503_6 \div 21_6$ (carry out to 6^{-3} place)