Math 303

p. 74 #3. MCMXXII
1922

#4. (a) 121
CXXI

(b) 42
XLII

#6. (a) 827,367
↑
hundreds

(b) 8,421,000
↑
tens

#7. (a) $3 \cdot 10^6 + 4 \cdot 10^3 + 5$
$= 3,000,000 + 4,000 + 5$
$= 3,004,005$

(b) $2 \cdot 10^4 + 1$
$= 20,000 + 1$
$= 20,001$

#8. 800 or 900
10, 30, 50, 70, or 90
9 + 1 = 10
8 + 1 + 1 = 10
The number is either
910 or 811.

#10. Exchange four units for one long.
Exchange four longs for one flat.
Exchange four flats for one block.
We now have 2 blocks, 1 flat,
1 long and 2 units.
The base-four numeral is
2112_{four}

#11. (a) 1, 10, 11, 100, 101, 110, 111,
1000, 1001, 1010, 1011, 1100,
1101, 1110, 1111

(b) 1, 2, 3, 10, 11, 12, 13, 20,
21, 22, 23, 30, 31, 32, 33

#15. (a) ETE_{twelve}, EEO_{twelve}, EEI_{twelve}

(b) 11111_{two}, 100000_{two}, 100001_{two}

(c) 554_{six}, 555_{six}, 1000_{six}

#16. (a) 204_{four}
The 4 is <u>not</u> a numeral
in base four.

(b) 607_{five}
The 6 and 7 are <u>not</u>
numerals in base five.

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#19. (a) 2 quarters, 9 nickels, and eight pennies.

Exchange 5 pennies for 1 nickel, now have 10 nickels and 3 pennies.

Exchange 10 nickels for 2 quarters, now have 4 quarters and no nickels.

We now have 4 quarters, no nickels, 3 pennies.

In base five, 403_{five}.

(b) Give the student 7 nickels and 3 pennies.

The student would exchange 5 nickles for 1 quarter.

The student would now have 1 quarter 2 nickels and 3 pennies.

In base five, 123_{five}.

#22. (a) $432_{five} = 4 \cdot 5^2 + 3 \cdot 5^1 + 2$

$= 4 \cdot 25 + 3 \cdot 5 + 2$

$= 100 + 15 + 2$

$= 117$

(b) $101101_{two} = 1 \cdot 2^5 + 1 \cdot 2^3 + 1 \cdot 2^2 + 1$

$= 1 \cdot 32 + 1 \cdot 8 + 1 \cdot 4 + 1$

$= 32 + 8 + 4 + 1$

$= 45$

(c) $92E_{twelve} = 9 \cdot 12^2 + 2 \cdot 12 + 11$

$= 9 \cdot 144 + 2 \cdot 12 + 11$

$= 1296 + 24 + 11$

$= 1331$

#24. (a) 58 days $= 56 + 2$

$= 8 \cdot 7 + 2$

$=$ 8 weeks, 2 days

(b) 29 hours $= 24 + 5$

$=$ 1 day, 5 hours.

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25. (a) $b2_{seven} = 44_{ten}$

$44_{ten} = 42 + 2$

$= 6 \cdot 7 + 2$

$= 62_{seven}$

$b = 6$

(b) $562_{twelve} = 734_{ten}$

$734_{ten} = 5 \cdot 144 + 12 + 2$

$= 5 \cdot 12^2 + 1 \cdot 12 + 2$

$= 512_{twelve}$

$b = 1$

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TIMSS 2345
↑
hundreds

b. 3

9740

b. nine thousand seven hundred forty

NAEP

6 pints = $3 \cdot 2$

= 3 quarts

a. 3