

Math 210A

Test 2

Name

Key

Grade _____ /75

Read all directions and follow them carefully. Show all work for full credit. Make sure all explanations are in complete sentences. Relax, breathe, and good luck. ☺

1. Answer each of the following based on place values (6 points)

How many hundreds in 135.46? Whole: 1, Exact: 1,3546

How many tenths in 135.46? Whole: 1354, Exact: 1354.6

How many thousandths in 135.46? Whole: 135460, Exact: 135460

2. The following refers to the Roman Numeral system (4 points)

a. The Roman numeral MXCII is what amount in our numeral system? 1092

$$1000 + (100 - 10) + 2$$

b. Is the Roman Numeral system a place-value system? YES NO

Explain:

you add up the amounts each symbol represents (or subtract)

3. Count from 0 to 100₄. (4 points)

0, 1, 2, 3, 10, 11, 12, 13, 20, 21, 22, 23,
30, 31, 32, 33, 100

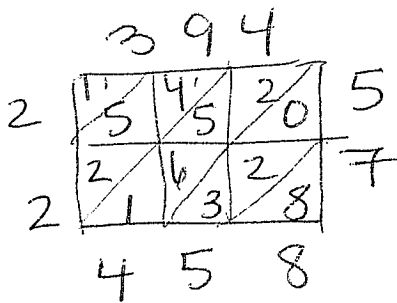
4. If a student wrote 34,254 in **base 4**, using a complete sentence explain why this could not be correct. Show how you could correct (or re-write) it and what the correct number would be. (4 points)

You cannot have the digits 4 or 5 in base 4, only digits 0, 1, 2, 3

$\begin{array}{r} 1 \downarrow \quad 1 \downarrow \\ 34254 \end{array}$

100,320

9. (4 points) Perform the following multiplication problem using a non-traditional algorithm (like lattice method or by using place values, etc.) Show all work. 394×57



OR

$$300 \times 50 = 15000$$

$$300 \times 7 = 2100$$

$$90 \times 50 = 4500$$

$$90 \times 7 = 630$$

$$4 \times 50 = 200$$

$$4 \times 7 = 28$$

$$22458$$

OR ??

10. (8 points) Below are two problems performed by students. Copy their methods to perform the indicated operation.

a. $7 \overline{)941}$

700	100
241	
210	30
31	
28	4
3	134

so $941 \div 7 = 134R3$

your problem: $2432 \div 5$

5	2432	
	2000	400
	432	
	400	80
	32	
	30	

2 480 remainder 2

b. 19×35

double

$1 \cdot 35 = 35$

$2 \cdot 35 = 70$

$4 \cdot 35 = 140$

$8 \cdot 35 = 280$

$16 \cdot 35 = 560$

double

since $19 = 16 + 2 + 1$,
 $19 \times 35 = 560 + 70 + 35 = 665$.

your problem: 22×55

$1 \cdot 55 = 55$

$2 \cdot 55 = 110 \leftarrow$

$4 \cdot 55 = 220 \leftarrow$

$8 \cdot 55 = 440$

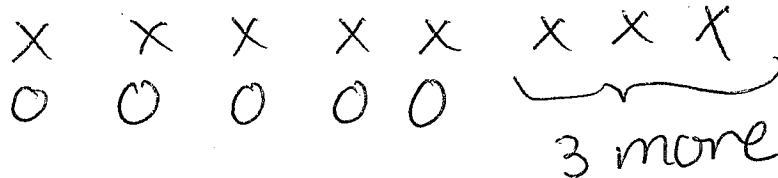
$16 \cdot 55 = 880 \leftarrow$

$22 = 16 + 6$ $= 16 + 4 + 2$	880 $+ 220$ 110 <u>1210</u>
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8. (10 points) For each story problem below, (a) solve the problem pictorially the way you think a child would solve it, (b) identify the type of word problem and operation that would be used to solve this problem without pictures, and (c) solve the problem without pictures.

I) Georgia has 8 mice and Tonya has 5 mice. How many more mice does Georgia have than Tonya?

a) Picture / model

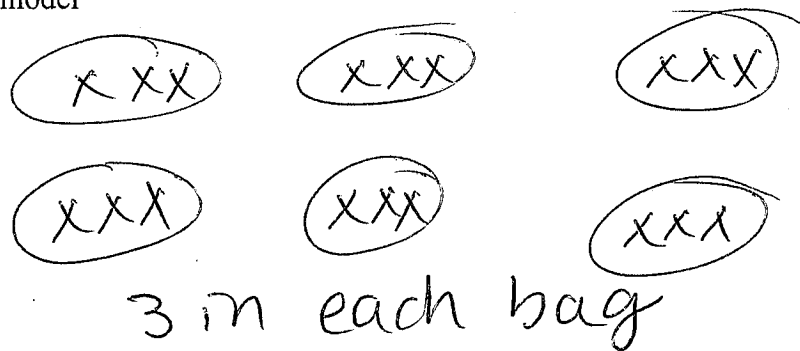


b) Type of problem: Comparison subtraction

c) Solve using a mathematical operation (numbers) $8 - 5 = 3$

II) Felix has 18 marbles to place in gift bags for his birthday party. He has 6 gift bags. How many marbles will go in each gift bag?

d) Picture / model



e) Type of problem: sharing / partitive division

f) Solve using a mathematical operation (numbers)

$$18 \div 6 = 3$$

5. What comes after 124_5 ? (6 points total)
 a. 125_5 b. 135_5 c. 130_5 d. 134_5

- What comes before 120_4 ?
 a. 119_4 b. 113_4 c. 124_4 d. 103_4

6. Convert from one base to the other. (12 points)

a. $187_{10} = \underline{273}_8$

$$\begin{array}{r|l} 64 & 8 & 1 \\ \hline 2 & 7 & 3 \end{array}$$

$$\begin{array}{r} 187 \\ -128 \\ \hline 59 \\ -56 \\ \hline 3 \end{array}$$

b. $101101_2 = \underline{45}_{10}$

$$\begin{array}{r|l} 32 & 16 & 8 & 4 & 2 & 1 \\ \hline 1 & 0 & 1 & 1 & 0 & 1 \\ \hline 32 & + & 8 & + & 4 & + & 1 = 45 \end{array}$$

c. $2T9_{12} = \underline{417}_{10}$

$$\begin{array}{r|l} 144 & 12 & 1 \\ \hline 2 & T & 9 \end{array}$$

$$2(144) + 10(12) + 9(1)$$

$$\begin{array}{r} 287 \\ -245 \\ \hline 42 \end{array}$$

d. $287_{10} = \underline{560}_7$

$$\begin{array}{r|l} 144 & 7 & 1 \\ \hline 15 & 6 & 0 \end{array}$$

(12)

7. Perform the following operations in base five. (4 points each)

a. $243_5 + 22_5$

$$\begin{array}{r} 1 \\ 243 \\ + 22 \\ \hline 320_5 \end{array}$$

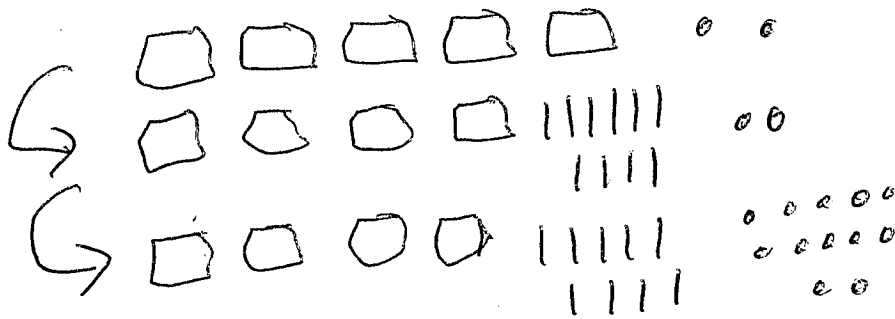
b. $301_5 - 144_5$

$$\begin{array}{r} 24 \\ 301 \\ - 144 \\ \hline 102_5 \end{array}$$

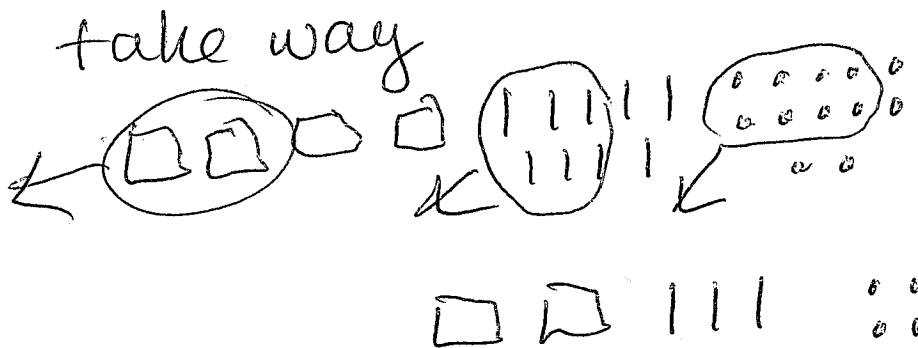
c. $43_5 \times 122_5$

$$\begin{array}{r} 14 \\ 43 \\ \times 122 \\ \hline 1421 \\ 10430 \\ \hline 11401_5 \end{array}$$

11. (5 points) Perform the following operation using base - 10 blocks. Draw squares for flats, vertical lines for longs, and dots for units. Make sure to write the answer. (I should see all re-groupings necessary). $502 - 268$



$$\begin{array}{r}
 4 \\
 502 \\
 -268 \\
 \hline
 4 \cancel{5} \cancel{0} 12 \\
 -268 \\
 \hline
 \end{array}$$



234

12. Bonus: (4 pts.) Consider the following two numbers:

440_a 1166_b where a and b represent different bases.

- What is the smallest base a can be? **5**
- What is the smallest base b can be? **7**
- If the two numerals above represent the same number, then is $a < b$ or $a > b$? **$a > b$**
- Explain how you know whether a or b is bigger.

The bigger number has smaller base to be same amount, 440 must have more in each place value to match 1166