| 2. Draw what the manipulatives would look at this point in the long division algorithm.	$$\begin{array}{r} 35 \\ 4\overline{)1429} \\ -12 \\ \hline 22 \\ -20 \\ \hline 29 \end{array}$$	Explain what each of the numbers represents in the manipulatives and the problem: a. What is 4? b. What is 35? c. What is 29?
3. Draw what the manipulatives would look at this point in the long division algorithm. 	$$\begin{array}{r} 4 \\ 6\overline{)2729} \\ -24 \\ \hline 32 \end{array}$$	Explain what each of the numbers represents in the manipulatives and the problem: a. What is 6? 6 groups b. What is 4? 400 in each group c. What is 32? 32 tens waiting to be shared
4. Draw what the manipulatives would look at this point in the long division algorithm.	$$\begin{array}{r} 26 \\ 3\overline{)805} \\ -6 \\ \hline 20 \\ -18 \\ \hline 25 \end{array}$$	Explain what each of the numbers represents in the manipulatives and the problem: a. What is 3? b. What is 26? c. What is 25?
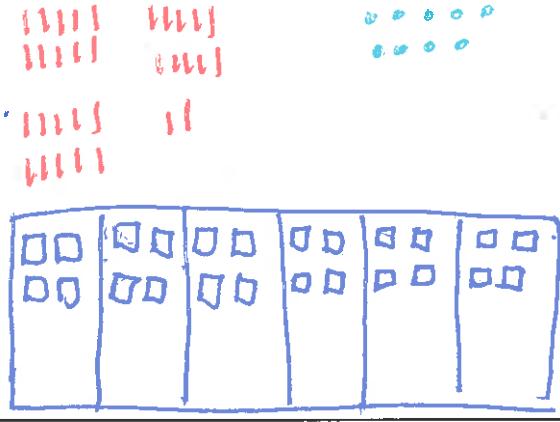
92-38   by adding up and using numbers that end in 0

2   50   2   = 54

38 40   or   90 92

2   10   10   10   10   10 2   = 54

38 40   50   60   70   80 90 92
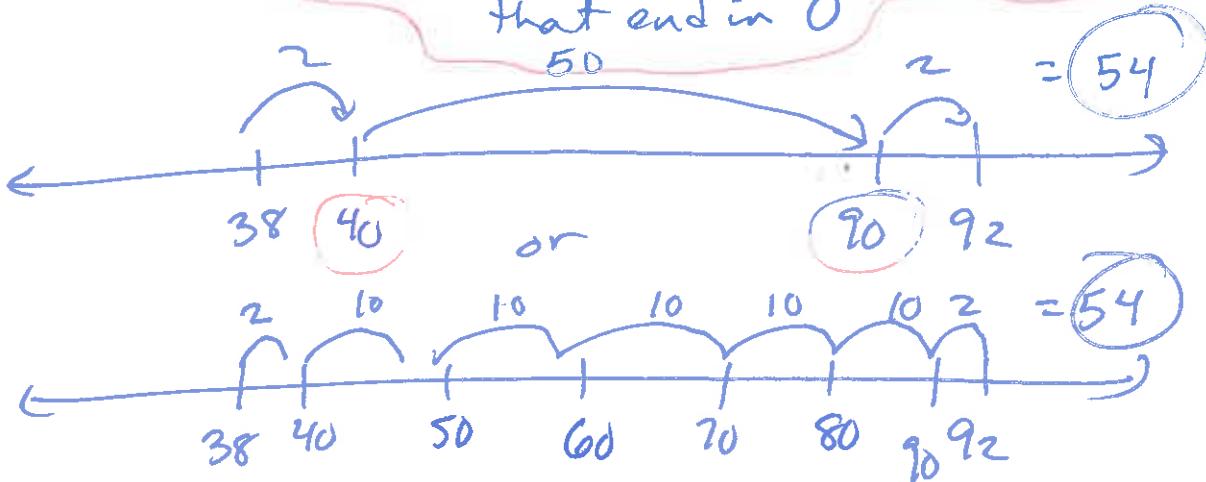
36 +29   add in place values and
Combine

$$30 + 20 = 50$$
$$6 + 9 = 15$$
$$+$$
$$65$$

$$\begin{array}{r}403\\-87\\\hline\end{array}\Rightarrow\qquad\overset{3}{\begin{array}{r}4\,\cancel{}10\;3\\-\;87\\\hline\end{array}}\Rightarrow\qquad\overset{3\;9\;13}{\begin{array}{r}\cancel{4}\,\cancel{10}\;\cancel{3}\\-\;87\\\hline\end{array}}$$

We need more 1's
and we don't have
any 10's.
So trade 100 for
10   10's.

Then we have 300
and 10 tens
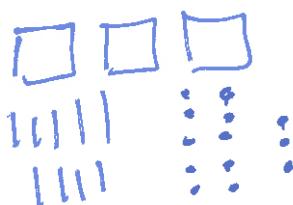
Now we can trade
a ten for 10   1's.

Then we have 9 10's
and   10+3 = 13   1's.

Exam   review #2

Multi-digit multiplication

name:_____ class time:_____

1. Answer these questions as if you were explaining the process of multiplying with the standard algorithm and the reasons why to a student.

a. In the standard algorithm, we write a 0 place holder in the ones place of the second partial product. Explain where that 0 comes from and what it does.

$$0 \quad \text{ones}$$

```
    5 6 4
  ×   3 8
```

b. In the process of multiplying, we multiply the tens digit of 38 by the ones digit of 564: 3× 4 = 12.

   i.   What place value should the digit 2 go in (tens) or ones)? Why should we write it there?

because   3 tens × 4 = 12 tens
                      ↖ tens
     30 × 4 = 120
               ↖ tens

   ii.   Where should we write the digit 1 (above which place value)? Why should we write it there?

- above the tens place
- Next we'll do tens × tens! 30 × 60 = hundreds
120
↑ hundred → add hundreds together

```
      4 4
  1 3 7 8
```

2. a. In the standard algorithm, we write a 0 place holder in the ones place of the second partial product. Explain where that 0 comes from and what it does.

Example from Thurs. class

$$
\begin{array}{r}
\overset{1}{5}6\;4 \\
\times\;3 \\
\hline
\end{array}
$$

If we did (above) ... 2

we shift answer ← to do

$$
\begin{array}{r}
5\overset{1}{6}\,4 \\
\times\;3\,0 \\
\hline
..\;\overset{2}{}\,0
\end{array}
$$

... 2 , 0

$$
\begin{array}{r}
1\;1 \\
5\;3 \\
5\;6\;4 \\
\times\;3\;8 \\
\hline
{}^{1}4\;5\;1\;2 \\
1\;6\;9\;2\;0 \\
\hline
2\;1{,}4\;3\;2
\end{array}
$$

3×4 is really

$30 \times 4 = 120$ so

2 goes in the tens place of
the answer

one explanation

another explanation