Math 246 Test 2 practice problems:

Scaffolding and expanded algorithms.

1. Show how to do each of these using the appropriate expanded algorithm:
   a. 478 + 394 b. 723 – 186 c. 246 × 87
2. Show how to do the problem $4793 \div 13$ using scaffolding division using easy products (x2, x3, etc)

Standard algorithms

3. For each step, fill in the missing manipulative picture, number work or explanatory sentence:

	$\begin{array}{r} 6\ 4\ 8 \\ -\ 2\ 8\ 3 \\ \hline \end{array}$	
		I can separate out 3 ones from the 8 ones. There are 5 ones left when I am done, so I write 5 in the ones place of the answer
	$\begin{array}{r} \overset{5}{\cancel{6}}\ 14\ 8 \\ -\ 2\ 8\ 3 \\ \hline 5 \end{array}$	
	$\begin{array}{r} \overset{5}{\cancel{6}}\ 14\ 8 \\ -\ 2\ 8\ 3 \\ \hline 6\ 5 \end{array}$	
		Take away 2 hundreds from 5 hundreds. There are 4 hundreds left, so write 4 in the hundreds place.

4. Show how to divide 24,609 ÷ 8 using long division.

5. a. Show how to find the product below using the standard algorithm.

$$\begin{array}{r} 2\ 4\ 7 \\ \times\ 6\ 3 \\ \hline \end{array}$$

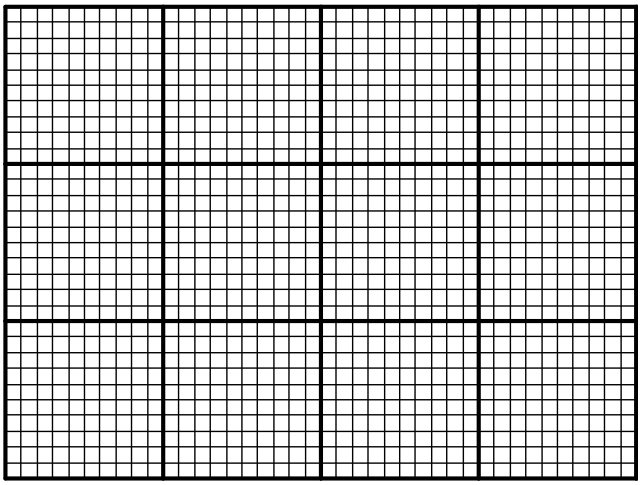
b. Before computing 6 × 7 in the standard algorithm we write a 0 in the partial product. Explain why we write a 0 there.

c. When you computed $6 \times 7 = 42$ as part of the problem, in what place value did you write the 2? Why is that the correct place?

d. When you computed $6 \times 7 = 42$ as part of the problem, in what place value did you write the 4 (above which number and which place value)? Why is that the correct place?

6. For the product 436 × 58
a. Draw a non-proportional array diagram
b. Write out the expanded algorithm
c. Write out the standard algorithm
d. Write out the lattice algorithm
e. Label or color-code all of a-d in a consistent way to show how the algorithms are related

7. For the product 27 × 34.
a. Draw a proportional array diagram on the grid provided
b. Write out the expanded algorithm
c. Write out the standard algorithm
d. Write out the lattice algorithm
e. Label or color-code all of a-d in a consistent way to show how the algorithms are related



8. Draw out what the division problem 531 ÷ 4 would look like when solved with manipulatives in 3 steps (one for each place value step).

9. Explain with words and a diagram why it works and makes sense that 4 × 6 = 6 × 4.
What is the name of this property?

10. Explain with words and a diagram why it works and makes sense that 4 × 7 = (4 × 5) + (4 × 2)
What is the name of this property?

12. a. Solve 4 × 8 using the strategy for 4's
b. Solve 6 × 8 using the strategy for 6's
c. Solve 6 × 3 using the strategy for 3's
d. Explain the fives pattern that helps you solve 5 × 8 quickly
e. Show how to solve 4 × 9 using the strategy for 9's.

13. a. Write a multiplication problem for 14 × 26
b. Write a partitive division problem for 84 ÷ 12
c. Write a measurement division problem for 84 ÷ 12

14. For each of these word problems, tell whether they are multiplication, partitive division or measurement division. Draw a bar diagram for each.

a. A tootsie roll costs 4¢. Ross has 24¢. How many tootsie rolls can he buy?
b. A toy train can go 20 feet in 5 seconds. How many feet can it go in one second?
c. A Jar of jam has 8 ounces of jam in it. How many ounces of jam are in 5 jars?
d. John has 4 pencils. Nathan has 5 times as many pencils as John. How many pencils does Nathan have?
e. Kyle has 24 crayons. He has 3 times as many crayons as Clara. How many crayons does Clara have?

15. For each of these word problems, tell whether they are multiplication, partitive division or measurement division. Describe how each might be solved by direct modeling.
a. Ms. Johnson baked 24 cookies. She wants to make plates of cookies that have 4 cookies on each plate. How many plates can she fill?
b. Kara has 5 boxes of dolls. Each box has 4 dolls in it. How many dolls does she have?
c. Four friends are sharing a bag of 24 marbles. How many marbles should each friend get?