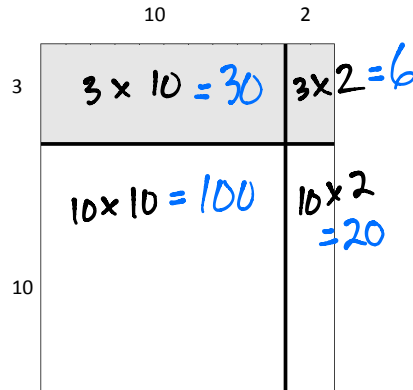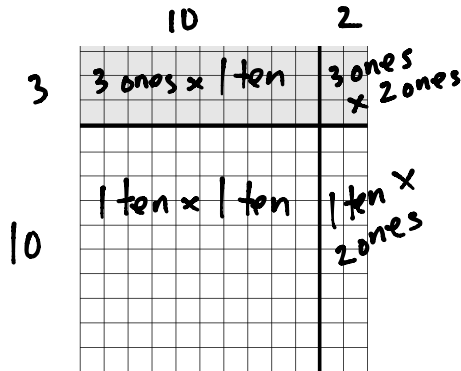Name _____     Date _____

1.

a.   In each of the two models pictured below, write the expressions that determine the area of each of the four smaller rectangles.

10      2

3   | 3 ones × 1 ten | 3 ones × 2 ones |
| 1 ten × 1 ten | 1 ten × 2 ones |

10

10      2

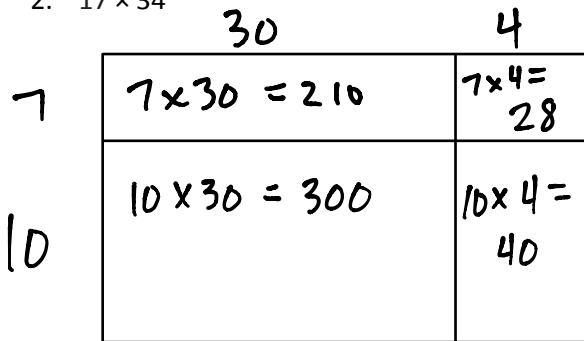3   | 3 × 10 = 30 | 3 × 2 = 6 |
| 10 × 10 = 100 | 10 × 2 = 20 |

10

b.   Using the distributive property, rewrite the area of the large rectangle as the sum of the areas of the four smaller rectangles.  Express first in number form and then read in unit form.

13 × 12 =  (3 × _10_ )  +  (3 × _2_ )   +   (10 × _10_ )   +   (10 × _2_ )

Use an area model to represent the following expressions.  Record the partial products and solve.

2.   17 × 34

30           4

7   | 7 × 30 = 210 | 7 × 4 = 28 |
| 10 × 30 = 300 | 10 × 4 = 40 |

10

$$\begin{array}{r} 3\ 4 \\ \times\ 1\ 7 \\ \hline 2\ 8 \\ 2\ 1\ 0 \\ 4\ 0 \\ +\ 3\ 0\ 0 \\ \hline 5\ 7\ 8 \end{array}$$

COMMON CORE

Lesson 36:     Multiply two-digit by two-digit numbers using four partial products.
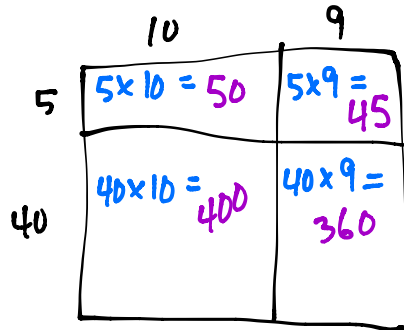Date:          8/28/13

engage<sup>ny</sup>     3.H.36

Draw an area model to represent the following expressions.  Record the partial products vertically and solve.

3.  45 × 18
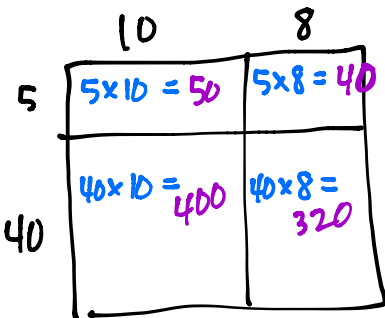


$$\begin{array}{r} 18 \\ \times\ 45 \\ \hline 40 \\ 50 \\ 3\,20 \\ +\ 4\,0\,0 \\ \hline 8\,1\,0 \end{array}$$

4.  45 × 19



$$\begin{array}{r} 19 \\ \times\ 45 \\ \hline 45 \\ 50 \\ 360 \\ +\ 400 \\ \hline 855 \end{array}$$

Visualize the area model and solve the following numerically using four partial products.  (You may sketch an area model if it helps.)

5.  12 × 47

$$\begin{array}{r} 47 \\ \times\ 12 \\ \hline 14 \\ 80 \\ 70 \\ +\ 400 \\ \hline 564 \end{array}$$

6.  23 × 93

$$\begin{array}{r} 93 \\ \times\ 23 \\ \hline 9 \\ 270 \\ 60 \\ +\ 1\,800 \\ \hline 2{,}139 \end{array}$$

7.  23 × 11

$$\begin{array}{r} 11 \\ \times\ 23 \\ \hline 3 \\ 30 \\ 20 \\ +\ 200 \\ \hline 253 \end{array}$$

8.  23 × 22

$$\begin{array}{r} 22 \\ \times\ 23 \\ \hline 6 \\ 60 \\ 40 \\ +\ 400 \\ \hline 506 \end{array}$$