5 GRADE

Mathematics Curriculum

SOLUTIONS

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GRADE 5 • MODULE 2

Multi-Digit Whole Number and Decimal Fraction Operations

SOLUTIONS

> **NOTE:** Student sheets should be printed at 100% scale to preserve the intended size of figures for accurate measurements. Adjust copier or printer settings to *actual size* and set page scaling to *none*.

EUREKA MATH™

Name _____   Date _____

1. Fill in the blanks using your knowledge of place value units and basic facts.

   a. 43 × 30

      Think: 43 ones × 3 tens = __129__ tens

      43 × 30 = __1,290__

   b. 430 × 30

      Think: 43 tens × 3 tens = __129__ hundreds

      430 × 30 = __12,900__

   c. 830 × 20

      Think: 83 tens × 2 tens = 166 __hundreds__

      830 × 20 = __16,600__

   d. 4,400 × 400

      __44__ hundreds × __4__ hundreds = 176 __10,000__

      4,400 × 400 = __1,760000__

   e. 80 × 5,000

      __8__ tens × __5__ thousands = 40 __1,9000__

      80 × 5,000 = __400000__

1000's	100's	10's	1's
		129	
1	2	9	0

2. Determine if these equations are true or false. Defend your answer using your knowledge of place value and the commutative, associative, and/or distributive properties.

   a. 35 hundreds = 5 tens × 7 tens

      True 5 tens × 7 tens = 5×7× ten × ten = 35 hundreds

   b. 770 × 6 = 77 × 6 × 100

      False. 770×6 = 77 tens × 6 = 77×6×10 ← not 100

   c. 50 tens × 4 hundreds = 40 tens × 5 hundreds

      True. 40 tens × 5 hundreds
      = 10 tens × 4 × 5 hundreds
      = 10 tens × 5 × 4 hundreds
      = 50 tens × 4 hundreds

   d. 24 × 10 × 90 = 90 × 2,400

      240 × 90

      90 × 240

      False

COMMON CORE

Lesson 1: Multiply multi-digit whole numbers and multiples of 10 using place value patterns and the distributive and associative properties.

Date: 7/4/13

engage^ny   2.A.13

3. Find the products. Show your thinking. The first row gives some ideas for showing your thinking.

   a. 5×5

      = 25

                    5×50

                    = 25×10

                    = 250

   50×50

   = $(5 \times 10) \times (5 \times 10)$

   = $(5 \times 5) \times 100$

   = 2,500

   50×500

   = $(5 \times 5) \times (10 \times 100)$

   = 25,000

   b. 80×5

   $8 \times 10 \times 5$
   $8 \times 5 \times 10$
   $40 \times 10 = \boxed{400}$

   80×50

   $8 \times 5 \times 10 \times 10$
   40×100
   $\boxed{4000}$

   800×500

   $8 \times 5 \times 100 \times 100$
   $40 \times 1,000$
   $\boxed{400,000}$

   $8,000 \times 50$

   $8 \times 5 \times 1000 \times 10$
   $40 \times 10,000$
   $\boxed{400,000}$

   c. 637×3

   $\boxed{1,911}$

   $6,370 \times 30$

   $637 \times 3 \times 10 \times 10$
   1911×100
   $\boxed{191,100}$

   $6,370 \times 300$

   $637 \times 3 \times 10 \times 100$
   $1911 \times 1,000$
   $\boxed{1,911,000}$

   $63,700 \times 300$

   $637 \times 3 \times 100 \times 100$
   $1911 \times 10,000$
   $\boxed{19,110,000}$

4. A concrete stepping stone measures 20 inches square. What is the area of 30 such tiles?

   20×30
   $2 \times 3 \times 10 \times 10$
   6×100
   600

   $\boxed{600 \text{ sq. in.}}$

5. A number is 42,300 when multiplied by 10. Find the product of this number and 500.

   $\underline{4230} \times 10 = 42,300$

   $4,230 \times 500$

   $423 \times 5 \times 10 \times 100$

   $2115 \times 1,000$

   $\boxed{2,115,000}$

Lesson 2 Homework 5•2

Name _____ Date _____

1. Round the factors to estimate the products.

   a. 697 × 82 ≈ __700__ × __80__ = __56,000__

   A reasonable estimate for 697 × 82 is __56,000__ .

   b. 5,897 × 67 ≈ __6,000__ × __70__ = __420,000__

   A reasonable estimate for 5,897 × 67 is __420,000__ .

   c. 8,840 × 45 ≈ __9000__ × __50__ = __450,000__

   A reasonable estimate for 8,840 × 45 is __450,000__ .

2. Complete the table using your understanding of place value and knowledge of rounding to estimate the product.

Factors	Rounded Factors	Estimate
a. 3,409 × 73	3,000 × 70	210,000
b. 82,290 × 240	80,000 × 200	16,000,000
c. 9,832 × 39	10,000 × 40	400,000
d. 98 tens × 36 tens	1000 × 400	400,000
e. 893 hundreds × 85 tens	90,000 × 900	81,000,000

3. The estimated answer to a multiplication problem is 800,000. Which of the following expressions could result in this answer? Explain how you know.

   8,146 × 12   81,467 × 121   8,146 × 121   81,477 × 1,217

   8000 × 10   80,000 × 100   8,000 × 100   80000 × 1000

   80,000   8,000,000   800,000   80,000,000

Lesson 2: Estimate multi-digit products by rounding factors to a basic fact and using place value patterns.
Date: 7/4/13

engage^{ny}

2.A.26

4. Fill in the blank with the missing estimate.

   a. $751 \times 34 \approx \underline{8000} \times \underline{30} = 24{,}000$

   b. $627 \times 674 \approx \underline{600} \times \underline{700} = 420{,}000$

   c. $7{,}939 \times 541 \approx \underline{8000} \times \underline{500} = 4{,}000{,}000$

5. In a single season the New York Yankees sell an average of 42,362 tickets for each of their 81 home games. About how many tickets do they sell for an entire season of home games?

   $42{,}362 \times 81 \approx 40{,}000 \times 80 = 3{,}200{,}000$

6. Raphael wants to buy a new car.

   a. He needs a down payment of $3,000. If he saves $340 each month, about how many months will it take him to save the down payment?

   $340 \times \underline{} = 3{,}000$

   $300 \times \underline{10} = 3000$

   (About 10 months)

   b. His new car payment will be $288 each month for five years. What is the total of these payments?
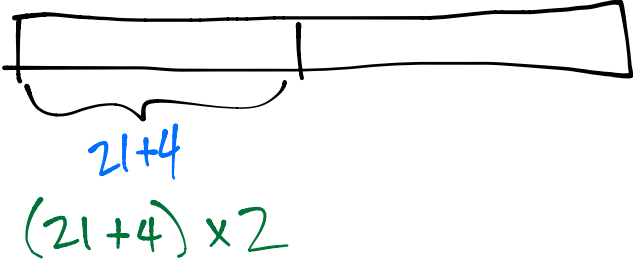
   $288 \times 12 \times 5$

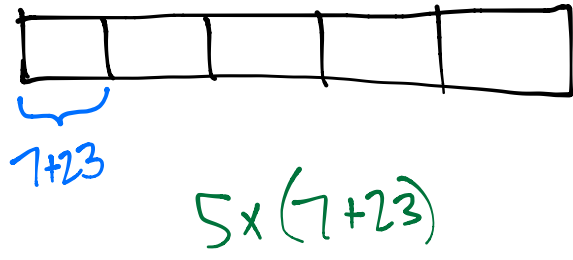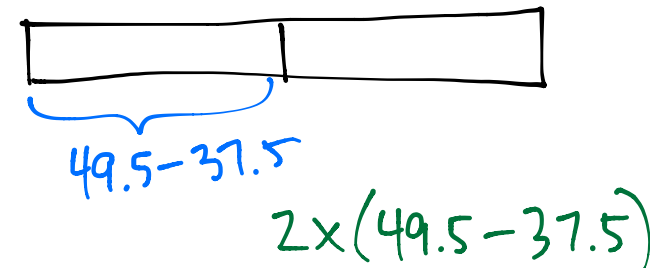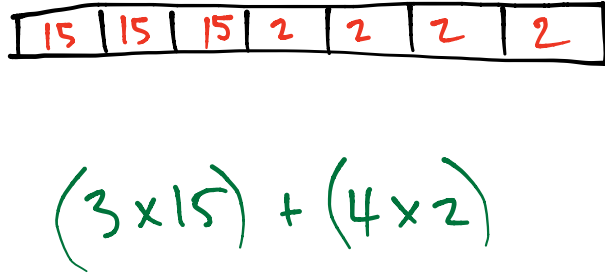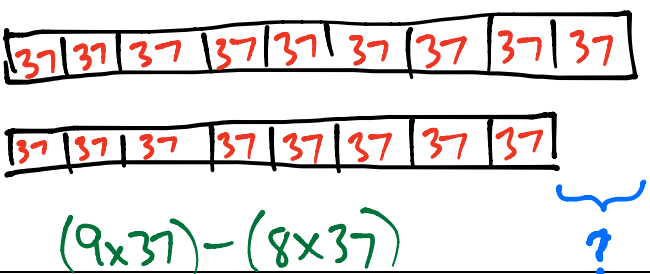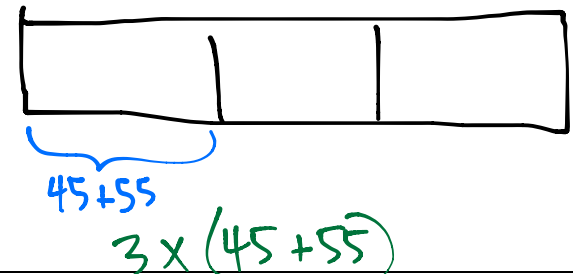 $300 \times 10 \times 5 = 300 \times 50 = 15000$

   (About $15,000)

![Common Core] **Lesson 2:**   Estimate multi-digit products by rounding factors to a basic fact and using place value patterns.

Date: 7/4/13

engage^{ny}   2.A.27

Name _____   Date _____

1. Draw a model then write the numerical expressions.

a. The sum of 21 and 4, doubled	b. 5 times the sum of 7 and 23
21+4 $(21+4) \times 2$	7+23 $5 \times (7+23)$
c. 2 times the difference between 49.5 and 37.5	**d.** The sum of 3 fifteens and 4 twos
49.5−37.5 $2 \times (49.5−37.5)$	15 15 15 2 2 2 2 $(3 \times 15) + (4 \times 2)$
e. The difference between 9 thirty-sevens and 8 thirty-sevens	**f.** Triple the sum of 45 and 55
37 37 37 37 37 37 37 37 37 37 37 37 37 37 37 37 37 $(9 \times 37) − (8 \times 37)$?	45+55 $3 \times (45+55)$

COMMON CORE   Lesson 3:   Write and interpret numerical expressions and compare expressions using a visual model.
Date: 7/4/13

engage^ny   2.B.14

2. Write the numerical expressions in words.

Expression	Words	The Value of the Expression
a. 10 × (2.5 + 13.5)	10 times the sum of 2.5 and 13.5	160
b. (98 − 78) × 11	11 times the difference between 98 and 78	220
c. (71 + 29) × 26	26 times the sum of 71 and 29.	2600
d. (50 × 2) + (15 × 2)	The sum of 50 twos and 15 twos.	130

3. Compare the two expressions using >, <, or =. In the space beneath each pair of expressions, explain how you can compare without calculating. Draw a model if it helps you.

a. 93 × (40 + 2)	>	(40 + 2) × 39

The left side is greater because it is 93 groups of (40 +2), but the right side only has 39 groups of (40 +2).

b. 61 × 25	>	60 twenty-fives minus 1 twenty-five

The left side is bigger because it is 61 twenty-fives, but the right side is only 59 twenty-fives.

COMMON CORE   Lesson 3:   Write and interpret numerical expressions and compare expressions using a visual model.
Date: 7/4/13

engage^ny   2.B.15

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4. Larry claims that (14 + 12) × (8 + 12) and (14 × 12) + (8 × 12) are equivalent because they have the same digits and the same operations.

   a. Is Larry correct? Explain your thinking.

   Larry is incorrect. The left is 26 copies of 20. The right is 14 copies of 12, plus 8 copies of 12.

   b. Which expression is greater? How much greater?

   The left is obviously bigger because 26 twentys is bigger than 22 twelves.

   $26 \times 20 = 26 \times 2 \times 10$

   $= 52 \times 10$

   $= 520$

   $(14 \times 12) + (8 \times 12)$

   $168 + 96$

   264

Common Core | Lesson 3: | Write and interpret numerical expressions and compare expressions using a visual model. | engage^ny | 2.B.16
Date: | 7/4/13

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Name _____   Date _____

1. Circle each expression that is not equivalent to the expression in **bold**.

   a. **37 × 19**

   37 nineteens   (30 × 19) − (7 × 29)   37 × (20 − 1)   (40 − 2) × 19

   b. **26 × 35**

   35 twenty-sixes   (26 + 30) × (26 + 5)   (26 × 30) + (26 × 5)   35 × (20 + 60)

   c. **34 × 89**

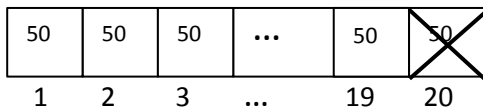   34 × (80 + 9)   (34 × 8) + (34 × 9)   34 × (90 − 1)   89 thirty-fours

2. Solve using mental math. Draw a tape diagram and fill in the blanks to show your thinking. The first one was done for you.

   a. 19 × 50 = __19__ fifties

50	50	50	...	50	50
1	2	3	...	19	20

   Think: 20 fifties − 1 fifties

   = (__20__ × 50) − (__1__ × 50)

   = __1000__ − __50__ = __950__

   b. 11 × 26 = __11__ twenty-sixes

   | 26 | 26 | 26 | 26 | . . . | 26 |

   10 twenty sixes   1 twenty six
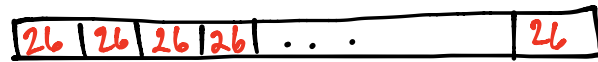
   Think: __10__ twenty-sixes + __1__ twenty-sixes

   = (__10__ × 26) + (__1__ × 26)

   = __260__ + __26__ = __286__

Lesson 4: Convert numerical expressions into unit form as a mental strategy for multi-digit multiplication.
Date: 7/4/13

engage^{ny}

2.B.27

c.   49 × 12 = _**49**_ twelves

50 twelves

| 12 | 12 | 12 | 12 | · · · | | 12 |

49 twelves

Think: _**50**_ twelves – 1 twelves

= (_**50**_ × 12) – (_**1**_ × 12)

= _**600**_ – _**12**_ = _**588**_

---

d.   12 × 25 = _**12**_ ~~seventy~~-fives   *twenty-fives*

| 25 | 25 | 25 | 25 | · · · · | | 25 | 25 |

10 twenty-fives   *2 twenty-fives*

Think: _**10**_ twenty-fives + _**2**_ twenty-fives

= (_**10**_ × 25) + (_**2**_ × 25)

= _**250**_ + _**50**_ = _**300**_

---

3. Define the unit in word form and complete the sequence of problems as was done in Problems 3–4 in the lesson.

a.   29 × 12 = 29 _**twelves**_

Think: 30 _**twelves**_ – 1 _**twelve**_

= 30 × _**12**_) – (1 × _**12**_)

= _**360**_ – _**12**_ = _**348**_

---

b.   11 × 31 = 31 _**elevens**_

Think: 30 _**elevens**_ + 1 _**eleven**_

= (30 × _**11**_) + (1 × _**11**_)

= _**330**_ + _**11**_ = _**341**_

---

c.   19 × 11 = 19 _**elevens**_

Think: 20 _**elevens**_ – 1 _**eleven**_

= (20 × _**11**_) – (1 × _**11**_)

= _**220**_ – _**11**_ = _**209**_

---

d.   50 × 13 = 13 _**fiftys**_

Think: 10 _**fiftys**_ + 3 _**fiftys**_

= (10 × _**50**_) + (3 × _**50**_)

= _**500**_ + _**150**_ = _**650**_

Lesson 4:   Convert numerical expressions into unit form as a mental strategy for multi-digit multiplication.

Date: 7/4/13

engage^ny   **2.B.28**

4. How can 12 × 50 help you find 12 × 49?

12×50 would be too big by 12. Now subtract 12 to get 12×49.

5. Solve mentally.

a. 16 × 99 = $(16 \times 100) - (16 \times 1) = 1600 - 16 = 1584$

b. 20 × 101 = $(20 \times 100) \times (20 \times 1) = 2000 + 20 = 2020$

6. Joy is helping her father to build a deck that measures 14 ft by 19 ft. Find the area of the deck using a mental strategy. Explain your thinking.

$14 \times 19 = (14 \times 20) - (14 \times 1)$

$= 280 - 14$

$= 266$

7. The Lason School turns 101 years old in June. In order to celebrate, they ask each of the 23 classes to collect 101 items and make a collage. How many total items will be in the collage? Use mental math to solve. Explain your thinking.
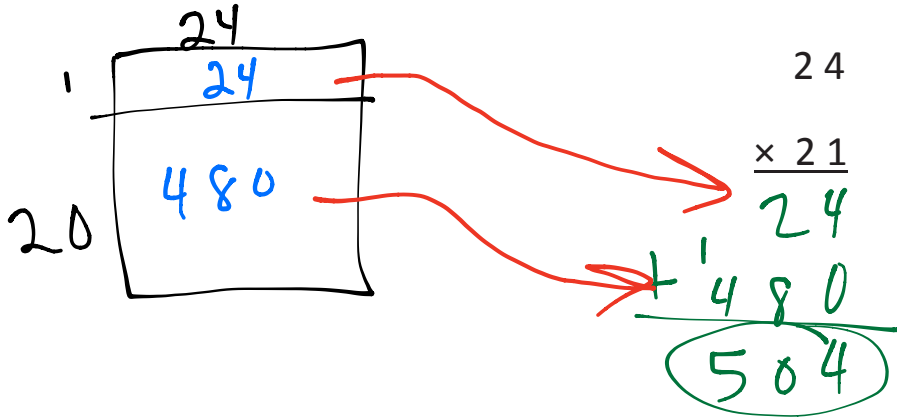
$23 \times 101 = (23 \times 100) + (23 \times 1)$

$= 2300 + 23$

$= 2323$

Name _____   Date _____

1. Draw an area model then solve using the standard algorithm. Use arrows to match the partial products from the area model to the partial products in the algorithm.

   a. 24 × 21 = _____

   b. 242 × 21 = _____

2. Solve using the standard algorithm.
   a. 314 × 22 = _____   b. 413 × 22 = _____   c. 213 × 32 = _____

Lesson 5: Connect visual models and the distributive property to partial products of the standard algorithm without renaming.
Date: 7/4/13

engage^ny   2.B.41
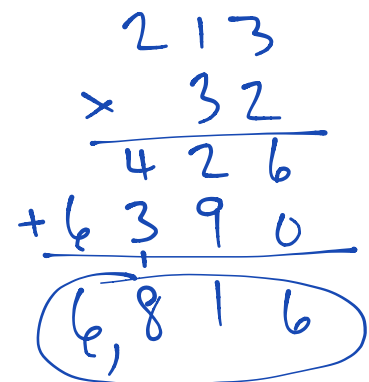
3. A young snake measures 0.23 m long. During the course of his lifetime, he will grow to be 13 times his current length. What will his length be when he's full grown?
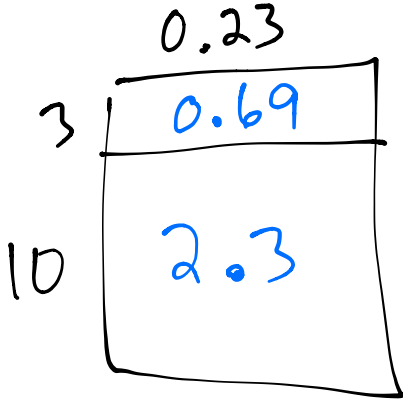
$$
\begin{array}{r}
0.23 \\
\times \quad 13 \\
\hline
69 \\
230 \\
\hline
2.99
\end{array}
$$

Area model:
```
       0.23
   ┌─────────┐
 3 │  0.69   │
   ├─────────┤
10 │  2.3    │
   └─────────┘
```

4. Zenin earns $142 per shift at his new job. During a pay period, he works 12 shifts. What would his pay be for that period?

Area model:
```
       142
   ┌─────────┐
 2 │  284    │
   ├─────────┤
10 │  1420   │
   └─────────┘
```
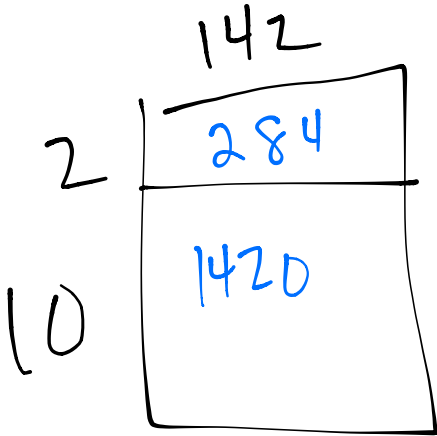
$$
\begin{array}{r}
142 \\
\times \quad 12 \\
\hline
284 \\
+1420 \\
\hline
1,704
\end{array}
$$

$1,704

COMMON CORE

Lesson 5:   Connect visual models and the distributive property to partial products of the standard algorithm without renaming.

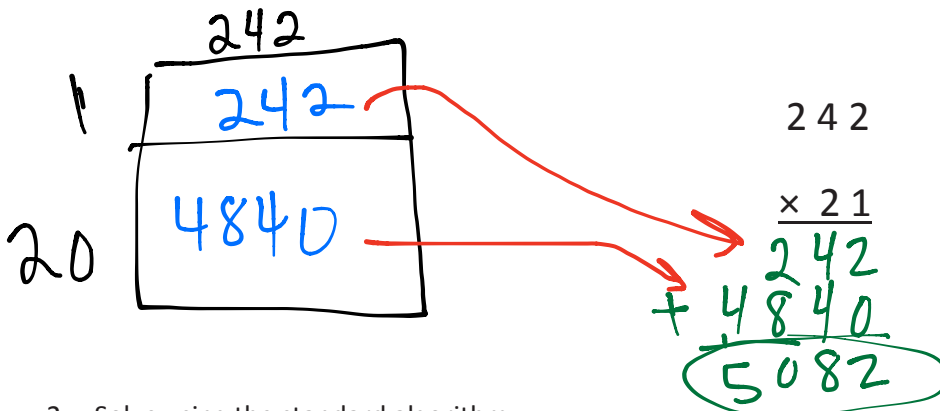Date: 7/4/13

engageny

2.B.42

Name _____   Date _____

1. Draw an area model, and then solve using the standard algorithm. Use arrows to match the partial products from your area model to the partial products in the algorithm.
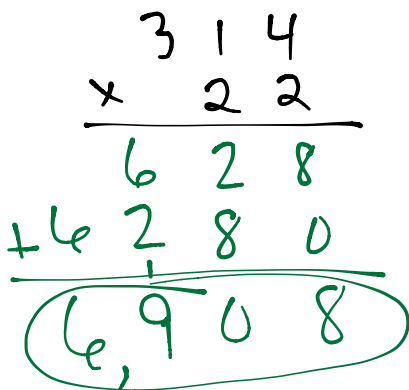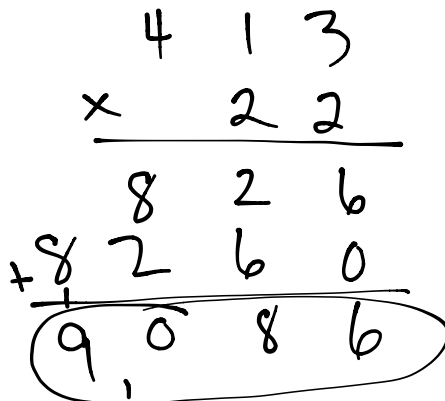
   a. 27 × 36 = _____

   a. 27 × 36 = _____

   $$
   \begin{array}{r}
   27 \\
   \times\ 36 \\
   \hline
   162 \\
   +\ 810 \\
   \hline
   972
   \end{array}
   $$

   b. 527 × 36 = _____

   $$
   \begin{array}{r}
   527 \\
   \times\ 36 \\
   \hline
   3162 \\
   +15810 \\
   \hline
   18972
   \end{array}
   $$

2. Solve using the standard algorithm.

   a. 649 × 53

   $$
   \begin{array}{r}
   649 \\
   \times\ \ \ 53 \\
   \hline
   1947 \\
   32450 \\
   \hline
   34397
   \end{array}
   $$

   34,397

   b. 496 × 53

   $$
   \begin{array}{r}
   496 \\
   \times\ \ \ 53 \\
   \hline
   1488 \\
   24800 \\
   \hline
   26288
   \end{array}
   $$

   26,288

   c. 758 × 46

   $$
   \begin{array}{r}
   758 \\
   \times\ \ 46 \\
   \hline
   4548 \\
   +30320 \\
   \hline
   34868
   \end{array}
   $$

   34,868

   d. 529 × 48

   $$
   \begin{array}{r}
   529 \\
   \times\ \ 48 \\
   \hline
   4232 \\
   +21160 \\
   \hline
   25392
   \end{array}
   $$

   25,392

COMMON CORE   Lesson 6:   Connect area diagrams and the distributive property to partial products of the standard algorithm without renaming.
Date: 7/4/13
engage^ny   2.B.53

3. Each of the 25 students in Mr. McDonald's class sold 16 raffle tickets. If each ticket cost $15, how much money did Mr. McDonald's students raise?

$$
\begin{array}{r}
25 \\
\times\ 16 \\
\hline
150 \\
250 \\
\hline
400
\end{array}
$$

→ 400 tickets

$$
\begin{array}{r}
400 \\
\times\ 15 \\
\hline
6000
\end{array}
\Big\}
\begin{array}{r}
15 \\
\times\ 4 \\
\hline
60
\end{array}
$$

$6,000

4. Jayson buys a car and pays by installments. Each installment is $567 per month. After 48 months, Jayson owes $1250. What was the total price of the vehicle?

$$
\begin{array}{r}
567 \\
\times\ 48 \\
\hline
4536 \\
22680 \\
\hline
27216
\end{array}
$$

| 567 | 567 | . . . . . | | 1250 |

48 × 567
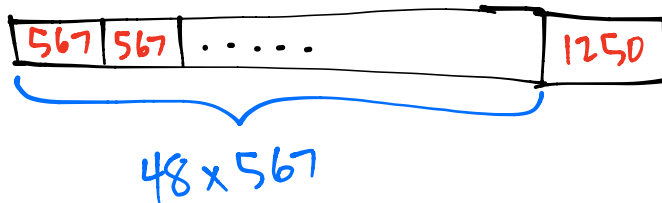
$$
\begin{array}{r}
27216 \\
+\ \ \ 1250 \\
\hline
28,466
\end{array}
$$

$28,466

COMMON CORE

Lesson 6:   Connect area diagrams and the distributive property to partial products of the standard algorithm without renaming.

Date: 7/4/13

engageny   **2.B.54**

Name _____ Date _____

1. Draw an area model, and then solve using the standard algorithm. Use arrows to match the partial products from your area model to the partial products in your algorithm.

   a. 273 × 346 = _____

$$
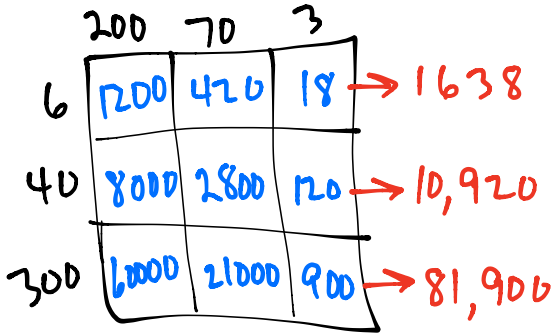\begin{array}{r}
2\ 7\ 3 \\
\times\ 3\ 4\ 6 \\
\hline
1\ 6\ 3\ 8 \\
1\ 0\ 9\ 2\ 0 \\
8\ 1\ 9\ 0\ 0 \\
\hline
9\ 4,4\ 5\ 8
\end{array}
$$

	200	70	3	
6	1200	420	18	→ 1638
40	8000	2800	120	→ 10,920
300	60000	21000	900	→ 81,900

   b. 273 × 306 = _____
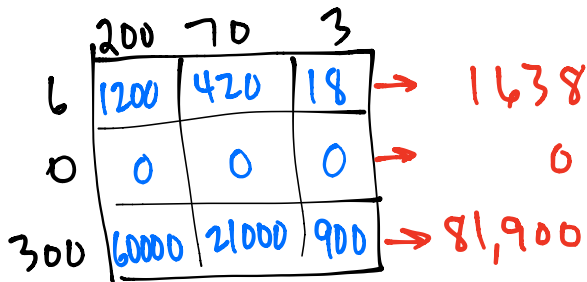
$$
\begin{array}{r}
2\ 7\ 3 \\
\times\ 3\ 0\ 6 \\
\hline
1\ 6\ 3\ 8 \\
+\ 8\ 1\ 9\ 0\ 0 \\
\hline
8\ 3,5\ 3\ 8
\end{array}
$$

	200	70	3	
6	1200	420	18	→ 1638
0	0	0	0	→ 0
300	60000	21000	900	→ 81,900

   c. Both Parts (a) and (b) have three-digit multipliers. Why are there three partial products in (a) and only two partial products in (b)?

Because in 306 there is no digit/value in the 10's place.

COMMON CORE

Lesson 7:

Date:

Connect area diagrams and the distributive property to partial products of the standard algorithm with renaming.

7/4/13

engage^{ny}

2.B.67

2. Solve by drawing the area model and using the standard algorithm.

   a. 7,481 × 290 = _____

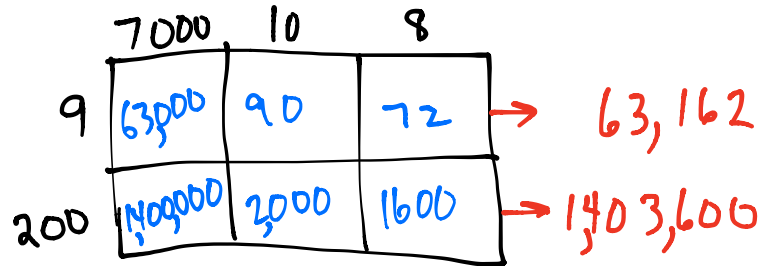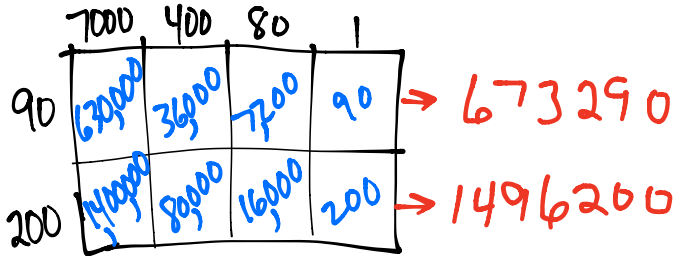|	7000	400	80	1	
90	630000	36000	7200	90	→ 673290
200	1400000	80000	16000	200	→ 1496200

   b. 7,018 × 209 = _____

	7000	10	8	
9	63000	90	72	→ 63,162
200	1400000	2000	1600	→ 1,403,600

3. Solve using the standard algorithm.

   a. 426 × 357

$$
\begin{array}{r}
426 \\
\times\ 357 \\
\hline
2982 \\
21300 \\
127800 \\
\hline
152082
\end{array}
$$

   b. 1,426 × 357

   → see next page

   c. 426 × 307

$$
\begin{array}{r}
426 \\
\times\ 307 \\
\hline
2982 \\
127800 \\
\hline
130,782
\end{array}
$$

   d. 1,426 × 307

   see next page.

4. The Hudson Valley Renegades Stadium holds a maximum of 4,505 people. During the heights of their popularity, they sold out 219 consecutive games. How many tickets were sold during this time?

$$
\begin{array}{r}
4505 \\
\times\ 219 \\
\hline
40545 \\
45050 \\
+\ 901000 \\
\hline
986595
\end{array}
$$

   986,595 tickets

5. At the farmer's market, each of the 94 vendors makes $502 in profit each weekend. How much profit will all vendors make on Saturday?

$$
\begin{array}{r}
502 \\
\times\ 94 \\
\hline
2008 \\
45180 \\
\hline
47,188
\end{array}
$$

   $47,188 profit

2a)

```
        7 4 8 1
    ×     2 9 0
  ─────────────
    6 7 3 2 9 0
  + 1 4 9 6 2 0 0
  ─────────────
  2 , 1 6 9 , 4 9 0
```

2b)

```
        7 0 1 8
    ×     2 0 9
  ─────────────
      6 3 1 6 2
  + 1 4 0 3 6 0 0
  ─────────────
  1 , 4 6 6 , 7 6 2
```

3b)

```
    1 4 2 6
      3 5 7
  ─────────
    9 9 8 2
  7 1 3 0 0
  4 2 7 8 0 0
  ─────────
  5 0 9 , 0 8 2
```

3d)

```
      1 4 2 6
    ×   3 0 7
  ───────────
      9 9 8 2
  + 4 2 7 8 0 0
  ───────────
  4 3 7 , 7 8 2
```

Name _____   Date _____

1. Estimate the product first. Solve by using the standard algorithm. Use your estimate to check the reasonableness of the product.

a. 312 × 149	b. 743 × 295	c. 428 × 637
≈ 300 × 100 = 30,000 3 1 2 × 1 4 9 2808 12480 +31200 46,488	≈ 700 × 300 = 210000 743 × 295 3715 66870 +148600 219,185	≈ 400 × 600 = 240,000 428 × 637 2996 12840 +256800 272,636
d. 691 × 305	e. 4,208 × 606	f. 3,068 × 523
≈ 700 × 300 = 210000 691 × 305 3455 +207300 210,755	≈ 4000 × 600 = 2,400,000 4208 × 606 25248 +2524800 2550,048	≈ 3,000 × 500 = 1,500,000 3068 × 523 9204 61360 +1534000 1,604,564
g. 430 × 3,064	h. 3,007 × 502	i. 254 × 6,104
≈ 400 × 3000 = 1,200,000 3064 × 430 91920 +1225600 1,317,520	≈ 3000 × 500 = 1,500,000 3007 × 502 6014 +1503500 1,509,514	≈ 300 × 6000 = 1,800,000 6104 × 254 24416 305200 +1220800 1,550,416

Lesson 8: Fluently multiply multi-digit whole numbers using the standard algorithm and using estimation to check for reasonableness of the products.

Date: 7/4/13

engage^ny   **2.B.78**

2. When multiplying 1,729 times 308, Clayton got a product of 53,253. Without calculating, does his product seem reasonable? Explain your thinking.

$$1729 \times 308$$
$$\approx 2000 \times 300$$
$$= 600,000$$

Clayton's product does not seem reasonable since our estimation is around 600,000.

3. A publisher prints 1,912 copies of a book in each print run. If they print 305 runs, the manager wants to know about how many books will be printed. What's a reasonable estimate?

$$1912 \times 305$$
$$\approx 2000 \times 300$$
$$= 600,000$$

Around 600,000 copies.

engage^ny   2.B.79

Name _____   Date _____

Solve.

1. Jeffery bought 203 sheets of stickers. Each sheet has a dozen stickers. He gave away 907 stickers to his family and friends on Valentine's Day. How many stickers does Jeffery have remaining?

$$
\begin{array}{r}
2\ 0\ 3\\
\times\ \ 1\ 2\\
\hline
4\ 0\ 6\\
+\ 2\ 0\ 3\ 0\\
\hline
2\ 4\ 3\ 6
\end{array}
\qquad\rightarrow\qquad
\begin{array}{r}
2\ 4\ 3\ 6\\
-\ \ 9\ 0\ 7\\
\hline
1\ 5\ 2\ 9
\end{array}
$$

(1529 stickers left)

2. During the 2011 season, a quarterback passed for 302 yards per game. He played in all 16 regular season games that year.

    a. How many total yards did the quarterback pass for?

$$
\begin{array}{r}
3\ 0\ 2\\
\times\ \ 1\ 6\\
\hline
1\ 8\ 1\ 2\\
+\ 3\ 0\ 2\ 0\\
\hline
4\ 8\ 3\ 2
\end{array}
$$

4832 yards

    b. If he matches this passing total for each of the next 13 seasons, how many yards will he pass for in his career?

$$
\begin{array}{r}
4\ 8\ 3\ 2\\
\times\ \ \ 1\ 3\\
\hline
1\ 4\ 4\ 9\ 6\\
+\ 4\ 8\ 3\ 2\ 0\\
\hline
6\ 2\ 8\ 1\ 6
\end{array}
$$

(62,816 yards)

3. Bao saved $179 a month. He saved $145 less than Ada each month. How much would Ada save in three and a half years?

$3\frac{1}{2}$ years $= 12+12+12+6 = 42$ months

Bao [tape diagram: 179]

Ada [tape diagram: 179 145]

324

$$
\begin{array}{r}
1\ 7\ 9\\
+\ 1\ 4\ 5\\
\hline
3\ 2\ 4
\end{array}
$$

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

Ada would save $13,608 in $3\frac{1}{2}$ years.

4. Mrs. Williams is knitting a blanket for her newborn granddaughter. The blanket is 2.25 meters long and 1.8 meters wide. What is the area of the blanket? Write the answer in centimeters.

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

40,500 square centimeters

5. Use the chart to solve.

Soccer Field Dimensions

	FIFA Regulation (in yards)	New York State High Schools (in yards)
Minimum Length	110	100
Maximum Length	120	120
Minimum Width	70	55
Maximum Width	80	80

a. Write an expression to find the difference in the maximum area and minimum area of a NYS high school soccer field. Then evaluate your expression.

$$(120 \times 80) - (100 \times 55)$$

4,100 sq. yrs.

$$9600 - 5500$$
$$4100$$

b. Would a field with a width of 75 yards and an area of 7,500 square yards be within FIFA regulation? Why or why not?

$$75 \times \underline{100} = 7500$$

Since the minimum length is 110 yards, this field is not within regulation.

c. It costs $26 to fertilize, water, mow, and maintain each square yard of a full size FIFA field (with maximum dimensions) before each game. How much will it cost to prepare the field for next week's match?

$$
\begin{array}{r}
120 \\
\times\ 80 \\
\hline
9600
\end{array}
$$

$$
\begin{array}{r}
9600 \\
\times\ 26 \\
\hline
5\,7\,6\,0\,0 \\
1\,9\,2\,0\,0\,0 \\
\hline
2\,4\,9\,6\,0\,0
\end{array}
$$

$249,600

COMMON CORE   Lesson 9:   Fluently multiply multi-digit whole numbers using the standard algorithm to solve multi-step word problems.

Date: 7/4/13

engage^ny   2.B.89
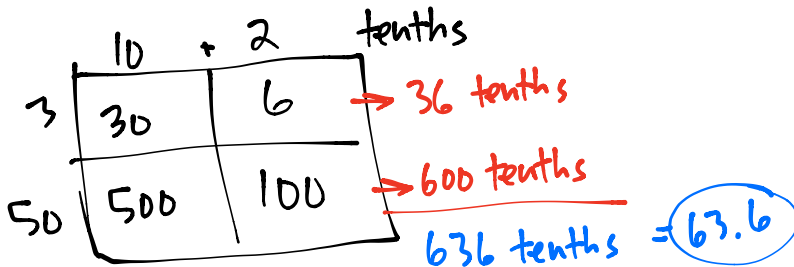
Name _____   Date _____

1. Estimate the product. Solve using an area model and the standard algorithm. Remember to express your products in standard form.

   a. $53 \times 1.2 \approx$ __50__ $\times$ __1__ $=$ __50__

   12 (tenths)

   $\times$ 53

   636 tenths = 63.6

   b. $2.1 \times 82 \approx$ __2__ $\times$ __80__ $=$ __160__

   21 (tenths)

   $\times$ 82
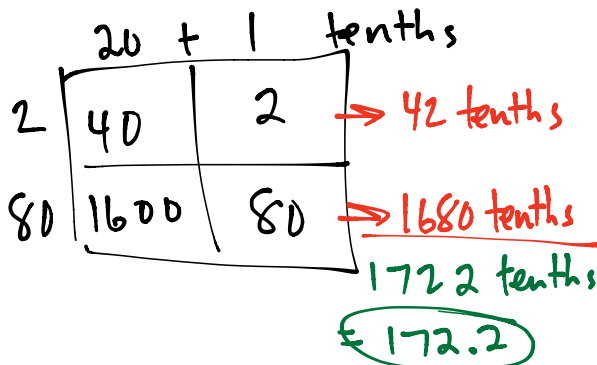
   1722 tenths = 172.2

2. Estimate, and then use the standard algorithm to solve. Express your products in standard form.

   a. $4.2 \times 34 \approx$ __4__ $\times$ __30__ $=$ __120__

   42 (tenths)

   $\times$ 34

   168
   + 1260
   1428 tenths

   = 142.8

   b. $65 \times 5.8 \approx$ __70__ $\times$ __6__ $=$ __420__

   58 (tenths)

   $\times$ 65

   290
   + 3480
   3770 tenths

   = 377

Lesson 10: Multiply decimal fractions with tenths by multi-digit whole numbers using place value understanding to record partial products.

Date: 7/4/13

engage^ny   **2.C.11**

c. 3.3×16

$$3.3 \xrightarrow{\times 10} 33$$
$$\times 16 \qquad \times 16$$
$$\overline{\qquad\qquad 198}$$
$$330$$
$$\overline{528} \xrightarrow{\div 10} \boxed{52.8}$$

d. 15.6×17

$$15.6 \xrightarrow{\times 10} 156$$
$$\times 17 \qquad \times 17$$
$$\overline{\qquad\qquad 1092}$$
$$+1560$$
$$\overline{2652} \xrightarrow{\div 10} \boxed{265.2}$$

e. 73×2.4

$$73 \qquad\qquad 73$$
$$\times 2.4 \xrightarrow{\times 10} \times 24$$
$$\overline{\qquad\qquad\quad 292}$$
$$1460$$
$$\overline{1752} \xrightarrow{\div 10} \boxed{175.2}$$

f. 193.5×57

$$193.5 \xrightarrow{\times 10} 1935$$
$$\times 57 \qquad \times 57$$
$$\overline{\qquad\qquad 13545}$$
$$+96750$$
$$\overline{110295} \xrightarrow{\div 10} 11029.5$$

3. Mr. Jansen is building an ice rink in his backyard that will measure 8.4 meters by 22 meters. What is the area of the rink?

$$8.4 \xrightarrow{\times 10} 84$$
$$\times 22 \qquad\quad \times 22$$
$$\overline{\qquad\qquad\quad 168}$$
$$1680$$
$$\overline{1848} \xrightarrow{\div 10} 184.8$$

$\boxed{184.8 \text{ sq. m.}}$

4. Rachel runs 3.2 miles each week day and 1.5 miles each day of the weekend. How many miles will she have run in 6 weeks?

$$3.2 \xrightarrow{\times 10} 32$$
$$\times 30 \qquad\quad \times 30$$
$$\overline{\qquad\qquad 960} \xrightarrow{\div 10} 96$$

$$1.5 \xrightarrow{\times 10} 15$$
$$\times 12 \qquad \times 12$$
$$\overline{\qquad\qquad 30}$$
$$+150$$
$$\overline{180} \xrightarrow{\div 10} 18$$

$$96 + 18 = \boxed{114 \text{ miles}}$$

Name _____   Date _____

1. Estimate the product. Solve using the standard algorithm. Use the thought bubbles to show your thinking. (Draw an area model on a separate sheet if it helps you.)

a. $2.42 \times 12 \approx$ __2__ $\times$ __12__ = __24__

Think: 242
(2.42 × 100)

```
    2 . 4 2
  ×    1 2
    4 8 4
  2 4 2 0
  2 9 0 4
```

Think! 2904 is 100 times too large! What is the real product?

2.42 × 12 = __29.04__

b. $4.13 \times 37 \approx$ __4__ $\times$ __40__ = __160__

Think 413
(4.13 ×100)

```
    4 . 1 3
  ×    3 7
  2 8 9 1
1 2 3 9 0
1 5 2 8 1
```

Now we have to divide by 100

4.13 × 37 = __152.81__

2. Solve using the standard algorithm.

a. 2.03×13 = __26.39__

```
  2 . 0 3
  ×   1 3
  6 0 9
2 0 3 0
2 6 . 3 9
```

b. 53.16×34

```
  5 3 . 1 6
  ×    3 4
  2 1 2 6 4
+ 1 5 9 4 8 0
1 8 0 7 . 4 4
```

c. 371.23×53

```
    3 7 1 . 2 3
  ×        5 3
  1 1 1 3 6 9
+ 1 8 5 6 1 5 0
1 9 6 7 5 . 1 9
```

d. 1.57×432

```
      1 . 5 7
  ×   4 3 2
    3 1 4
  4 7 1 0
+ 6 2 8 0 0
6 7 8 . 2 4
```

3. Use the whole number product and place value reasoning to place the decimal point in the second product. Explain how you know.

a. If 36 × 134 = 4,824   then   36 × 1.34 = __48.24__

b. If 84 × 2,674 = 224,616   then   84 × 26.74 = __2246.16__

c. 19 × 3,211 = 61,009   then   321.1 × 19 = __6100.9__

4. A slice of pizza costs $1.57. How much does 27 slices cost?

$$\begin{array}{r} 1.57 \\ \times\ \ \ 27 \\ \hline 1099 \\ 3140 \\ \hline 42.39 \end{array}$$

$42.39

5. A spool of ribbon holds 6.75 meters. If the craft club buys 21 spools:

a. What is the total cost if the ribbon sells for $2 per meter?

6.75 × 21 × 2

6.75 × 42

$$\begin{array}{r} 6.75 \\ \times\ \ 42 \\ \hline 13\ 50 \\ 270\ 0\ 0 \\ \hline 283.50 \end{array}$$

$283.50

b. If the club uses 76.54 meters to complete a project, how much ribbon will be left?

$$\begin{array}{r} 6.75 \\ \times\ \ 21 \\ \hline 675 \\ 1350\ 0 \\ \hline 141.75 \end{array}$$

$$\begin{array}{r} 141.75 \\ -\ \ 76.54 \\ \hline 65.21 \end{array}$$

65.21 yards

COMMON CORE   **Lesson 11:** Multiply decimal fractions by multi-digit whole numbers through conversion to a whole number problem and reasoning about the placement of the decimal.

engage^ny   **2.C.24**

Date: 7/4/13

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Name _____   Date _____

1. Estimate, and then solve using the standard algorithm. You may draw an area model if it helps you.

a. $24 \times 2.31 \approx$ __20__ $\times$ __2__ = __40__

$$
\begin{array}{r}
2.31 \\
\times\ 24 \\
\hline
924 \\
+\ 4620 \\
\hline
55.44
\end{array}
$$

b. $5.42 \times 305 \approx$ __5__ $\times$ __300__ = __1500__

$$
\begin{array}{r}
5.42 \\
\times\ 305 \\
\hline
2710 \\
+\ 162600 \\
\hline
1653.10
\end{array}
$$

2. Estimate, and then solve using the standard algorithm. Use a separate sheet to draw the area model if it helps you.

a. 1.23×21

$\approx 1 \times 21 = 21$

$$
\begin{array}{r}
1.23 \\
\times\ 21 \\
\hline
123 \\
+\ 2460 \\
\hline
25.83
\end{array}
$$

b. 3.2×41

$\approx 3 \times 40 = 120$

$$
\begin{array}{r}
3.2 \\
\times\ 41 \\
\hline
32 \\
1286 \\
\hline
131.2
\end{array}
$$

c. 0.32×41

$\approx \frac{1}{2} \times 40 = 20$

$$
\begin{array}{r}
0.32 \\
\times\ 41 \\
\hline
032 \\
+\ 1280 \\
\hline
13.12
\end{array}
$$

d. 0.54×62

$\approx \frac{1}{2} \times 62 = 31$

$$
\begin{array}{r}
0.54 \\
\times\ 62 \\
\hline
108 \\
+\ 3240 \\
\hline
33.48
\end{array}
$$

Lesson 12:   Reason about the product of a whole number and a decimal with hundredths using place value understanding and estimation.

Date: 7/4/13

engageny   2.C.32

e. 6.09 × 28

$\approx 6 \times 30 = 180$

$$
\begin{array}{r}
6.09 \\
\times\ 28 \\
\hline
4872 \\
12180 \\
\hline
170.52
\end{array}
$$

f. 6.83 × 683

$\approx 7 \times 700$
$= 4900$

$$
\begin{array}{r}
6.83 \\
\times\ 683 \\
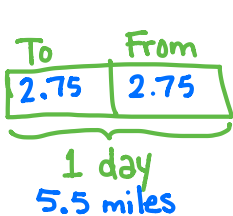\hline
2049 \\
54640 \\
+\ 409800 \\
\hline
4664.89
\end{array}
$$

g. 6.09 × 208

$\approx 6 \times 200$
$= 1200$

$$
\begin{array}{r}
6.09 \\
\times\ 208 \\
\hline
4872 \\
+121800 \\
\hline
1266.72
\end{array}
$$

h. 171.76 × 555

$\approx 200 \times 600$
$= 120,000$

$$
\begin{array}{r}
171.76 \\
\times\ 555 \\
\hline
85880 \\
858800 \\
+8588000 \\
\hline
95326.80
\end{array}
$$

3. Eric walks 2.75 miles to and from work every day for an entire year. How many miles did he walk?

To	From
2.75	2.75

1 day
5.5 miles

$$
\begin{array}{r}
3\overset{2}{6}5 \\
\times\ 5.5 \\
\hline
1825 \\
+18250 \\
\hline
2007.5
\end{array}
$$

Eric walked 2007.5 miles during the year.

NOTE: It is likely students may interpret the problem as Eric walking only 2.75 mi per day. This is understandable! Roll with it.

4. Art galleries often price paintings by the square inch. If a painting measures 22.5 inches by 34 inches and costs $4.15 per square inch, what is the selling price for the painting?

$$
\begin{array}{r}
22.5 \\
\times\ 34 \\
\hline
900 \\
6750 \\
\hline
765.0
\end{array}
$$

$$
\begin{array}{r}
4.15 \\
\times\ 765 \\
\hline
2075 \\
24900 \\
+290500 \\
\hline
3174.75
\end{array}
$$

$$\$3174.75$$

5. Gerry spends $1.25 each day on lunch at school. On Fridays she buys an extra snack for $0.55. How much money will she spend in two weeks?

$$
\begin{array}{r}
1.25 \\
+\ .55 \\
\hline
1.80
\end{array}
$$

$$
\begin{array}{r}
1.25 \\
\times\ 8 \\
\hline
10.00
\end{array}
$$

$$
\begin{array}{r}
1.80 \\
\times\ 2 \\
\hline
3.60
\end{array}
$$

$$
\begin{array}{r}
10.00 \\
+\ 3.60 \\
\hline
13.60
\end{array}
$$

$$\$13.60$$

COMMON CORE

Lesson 12: Reason about the product of a whole number and a decimal with hundredths using place value understanding and estimation.

Date: 7/4/13

engage^ny

2.C.33

Name _____   Date _____

1. Solve. The first one is done for you.

<table>
<tr><td>

a. Convert weeks to days.

6 weeks = 6 × (1 week)

= 6 × (7 days)

= 42 days

</td><td>

b. Convert years to days.

7 years = __7__ × (__1__ year)

= __7__ × (__365__ days)

= __2,555__ days

</td></tr>
<tr><td>

c. Convert meters to centimeters.

4.5 m = __4.5__ × (__1__ m)

= __4.5__ × (__100__ cm)

= __450__ cm

</td><td>

d. Convert pounds to ounces.

12.6 pounds = 12.6 × (1 lb)

= 12.6 × (16 oz)

= 201.6 ounces

</td></tr>
<tr><td>

e. Convert kilograms to grams.

3.09 kg = 3.09 × (1 kg)

= 3.09 × (1,000 g)

= 3,090 g

</td><td>

f. Convert yards to inches.

245 yd = 245 × (1 yd)

= 245 × (3 ft)

= 245 × 3 × (1 ft)

= 245 × 3 × (12 in)

= 8,820 in

</td></tr>
</table>

EUREKA MATH

Lesson 13: Use whole number multiplication to express equivalent measurements.

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2. After solving, write a statement to express each conversion. The first one is done for you.

a. Convert the number of hours in a day to minutes.
 	
   24 hours = 24 × (1 hour)
          = 24 × (60 minutes)
          = 1,440 minutes
 	
One day has 24 hours, which is the same as 1,440 minutes.
	b. A newborn giraffe weighs about 65 kilograms. How much does it weigh in grams?
	
	$65 \text{ kg} = 65 \times (1 \text{ kg})$
	$= 65 \times (1{,}000 \text{ g})$
	$= 65{,}000 \text{ g}$
	
	One kilogram has 1,000 grams, so 65 kilograms is the same as 65,000 grams.

c. The average height of a female giraffe is 4.6 meters. What is her height in centimeters? $4.6 \text{ m} = 4.6 \times (1 \text{ m})$ $= 4.6 \times (100 \text{ cm})$ $= 460 \text{ cm}$ One meter has 100 centimeters, so 4.6 meters is the same as 460 centimeters.	d. The capacity of a beaker is 0.1 liter. Convert this to milliliters. $0.1 \text{ L} = 0.1 \times (1 \text{ L})$ $= 0.1 \times (1{,}000 \text{ mL})$ $= 100 \text{ mL}$ One liter has 1,000 milliliters, so 0.1 liter is the same as 100 milliliters.
e. A pig weighs 9.8 pounds. Convert the pig's weight to ounces. $9.8 \text{ lb} = 9.8 \times (1 \text{ lb})$ $= 9.8 \times (16 \text{ oz})$ $= 156.8 \text{ oz}$ One pound has 16 ounces, so 9.8 pounds is the same as 156.8 ounces.	f. A marker is 0.13 meters long. What is the length in millimeters? $0.13 \text{ m} = 0.13 \times (1 \text{ m})$ $= 0.13 \times (1{,}000 \text{ mm})$ $= 130 \text{ mm}$ One meter has 1,000 millimeters, so 0.13 meters is the same as 130 millimeters.

EUREKA MATH™

Lesson 13:   Use whole number multiplication to express equivalent measurements.

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Name _____   Date _____

1. Solve. The first one is done for you.

---

a. Convert days to weeks.

42 days = 42 × (1 day)

$= 42 \times \left(\frac{1}{7} \text{ week}\right)$

$= \frac{42}{7}$ week

= 6 weeks

---

b. Convert quarts to gallons.

36 quarts = __**36**__ × (1 quart)

$=$ __**36**__ $\times \left(\frac{1}{4} \text{ gallon}\right)$

$=$ __$\frac{36}{4}$__ gallons

$=$ __**9**__ gallons

---

c. Convert centimeters to meters.

760 cm = __**760**__ × (__**1**__ cm)

$=$ __**760**__ × (__**0.01**__ m)

$=$ __**7.6**__ m

---

d. Convert meters to kilometers.

2,485 m = __**2,485**__ × (__**1**__ m)

$=$ __**2,485**__ × (0.001 km)

$=$ __**2.485**__ km

---

e. Convert grams to kilograms.

3,090 g = **3,090 × (1 g)**

= 3,090 × (0.001 kg)

= 3.090 kg

= 3.09 kg

---

f. Convert milliliters to liters.

205 mL = **205 × (1 mL)**

= 205 × (0.001 L)

= 0.205 L

Lesson 14:   Use fraction and decimal multiplication to express equivalent measurements.

EUREKA
MATH™

2. After solving, write a statement to express each conversion. The first one is done for you.

a. The screen measures 36 inches. Convert 36 inches to feet. 36 inches = 36 × (1 inch) $= 36 \times \left(\frac{1}{12} \text{ feet}\right)$ $= \frac{36}{12}$ feet = 3 feet The screen measures 36 inches or 3 feet.	b. A jug of juice holds 8 cups. Convert 8 cups to pints. $8c = 8 \times (1\ c)$ $= 8 \times (\frac{1}{2}\ p)$ $= \frac{8}{2}\ p$ $= 4\ p$ One cup makes 1/2 pint, so 8 cups is the same as 4 pints.
c. The length of the flower garden is 529 centimeters. What is its length in meters? $529\ cm = 529 \times (1\ cm)$ $= 529 \times (0.01\ m)$ $= 5.29\ m$ One centimeter makes 1/100 = 0.01 meter, so 529 centimeters is the same as 5.29 meters.	d. The capacity of a container is 2,060 milliliters. Convert this to liters. $2,060\ mL = 2,060 \times (1\ mL)$ $= 2,060 \times (0.001\ L)$ $= 2.06\ L$ One milliliter makes 1/1,000 = 0.001 liter, so 2,060 milliliters is the same as 2.06 liters.
e. A hippopotamus weighs 1,560,000 grams. Convert the hippopotamus' weight to kilograms. $1,560,000\ g = 1,560,000 \times (1\ g)$ $= 1,560,000 \times (0.001\ kg)$ $= 1,560\ kg$ One gram makes 1/1,000 = 0.001 kilogram, so 1,560,000 grams is the same as 1,560 kilograms.	f. The distance was 372,060 meters. Convert the distance to kilometers. $372,060\ m = 372,060 \times (1\ m)$ $= 372,060 \times (0.001\ km)$ $= 372.06\ km$ One meter makes 1/1,000 = 0.001 kilometer, so 372,060 meters is the same as 372.06 kilometers.

Lesson 14:   Use fraction and decimal multiplication to express equivalent measurements.

EUREKA MATH™

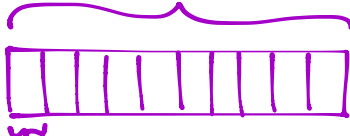© 2014 Common Core, Inc. All rights reserved. commoncore.org

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Name _____   Date _____

Solve.

1. Tia cut a 4 meters 8 centimeters wire into 10 equal pieces. Marta cut a 540 centimeters wire into 9 equal pieces. How much longer is one of Marta's wires than one of Tia's?

$$4m\ 8cm = 4 \times (100\ cm) + 8\ cm = 408\ cm$$

$$408\ cm \div 10 = 40.8\ cm$$
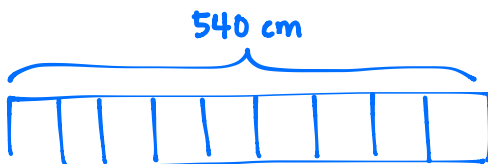
$$540\ cm$$

$$540\ cm \div 9 = 60\ cm$$

$$\begin{array}{r} 59 \\ \cancel{60}\ 10 \\ -\ 40.8 \\ \hline 19.2 \end{array}$$

One of Marta's wires is 19.2 cm longer than one of Tia's.

2. Jay needs 19 quarts more paint for the outside of his barn than for the inside. If he uses 107 quarts in all, how many gallons of paint will be used to paint the inside of the barn?

Outside: $x + 19$ x 19 qt
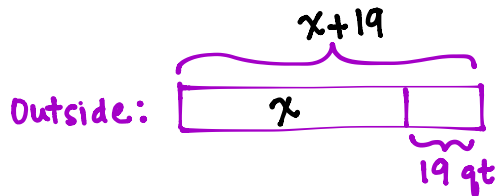
Inside: x

x = number of qts used inside

11 gallons will be used to paint the inside of the barn.

107 qt x x 19
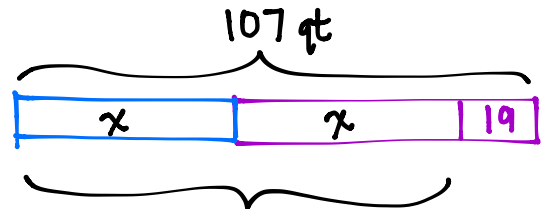
$$107 - 19 = 88$$

$$x = 88 \div 2 = 44\ qt$$

$$44\ qt = 44 \times \left(\tfrac{1}{4}\ gallon\right)$$

$$= \frac{44}{4}$$

$$= \frac{\cancel{4} \times 11}{\cancel{4}}$$

$$= 11\ gallons$$

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3. String A is 35 centimeters long. String B is 5 times as long as String A. Both are necessary to create a decorative bottle. Find the total length of string needed for 17 identical decorative bottles. Express your answer in meters.

1 bottle:

A $\overline{}$
35 cm

B |———•———•———•———•———•———|

5×35 = 175 cm

Together: 175
         + 35
         ————
         210 cm

17 bottles: 210 cm
            × 17
            ————
            1470
          + 2100
          ————————
          3570 cm = 3570 × (0.01 m) = $\boxed{35.7 \text{ m}}$

The total length of string needed for 17 bottles is 35.7 meters.

4. A pineapple is 7 times as heavy as an orange. The pineapple also weighs 870 grams more than the orange.

   a. What is the total weight in grams for the pineapple and orange?

   x = weight of an orange

   orange: $\boxed{x}$

   pineapple: | x | x | x | x | x | x | x |

   (brace labeled 870)

   $6 \overline{)870}$
   $\underline{-6}$
   27
   $\underline{-24}$
   30
   145 = x

   Total = 145 g
           × 8
           ————
           $\boxed{1160 \text{ g}}$

   The total weight is 1,160 grams.

   b. Express the total weight of the pineapple and orange in kilograms.

   1,160 g = 1,160 × (0.001 kg)
           = $\boxed{1.16 \text{ kg}}$

Lesson 15:   Solve two-step word problems involving measurement conversions.

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Name _____   Date _____

1. Divide. Draw number disks to show your thinking for (a) and (c). You may draw disks on your personal white board to solve the others if necessary.

a. 300 ÷ 10	b. 450 ÷ 10
See next page	45
c. 18,000 ÷ 100	d. 730,000 ÷ 100
see next page	7300
e. 900,000 ÷ 1,000	f. 680,000 ÷ 1,000
900	680

2. Divide. The first one is done for you.

a. 18,000 ÷ 20	b. 18,000 ÷ 200	c. 18,000 ÷ 2,000
= 18,000 ÷ 10 ÷ 2 = 1,800 ÷ 2 = 900	= 18,000 ÷ 100 ÷ 2 = 180 ÷ 2 = 90	= 18000 ÷ 1000 ÷ 2 = 18 ÷ 2 = 9
d. 420,000 ÷ 60	e. 420,000 ÷ 600	f. 420,000 ÷ 6,000
= 420000 ÷ 10 ÷ 6 = 42000 ÷ 6 = 7000	= 420000 ÷ 100 ÷ 6 = 4200 ÷ 6 = 700	= 420000 ÷ 1000 ÷ 6 = 420 ÷ 6 = 70

a) $300 \div 10 = 30$

100 → $\div 10$ → 10 ⎫
100 → → 10 ⎬ 30
100 → → 10 ⎭

c) $18,000 \div 100 = 180$

10,000
1000
1000
1000
1000
1000
1000
1000
1000 ⎫ $\div 100 =$ ⎬ 100
10
10
10
10
10
10
10
10 = 180

g. 24,000 ÷ 30	h. 560,000 ÷ 700	i. 450,000 ÷ 9,000
$= 24000 \div 10 \div 3$	$= 560000 \div 100 \div 7$	$= 450000 \div 1000 \div 9$
$= 2400 \div 3$	$= 5600 \div 7$	$= 450 \div 9$
$= 800$	$= 800$	$= 50$

3. A stadium holds 50,000 people. The stadium is divided into 250 different seating sections. How many seats are in each section?

$50000 \div 250$

$= 50000 \div 10 \div 25$

$= 5000 \div 25$

$= 200$

200 seats

4. Over the course of a year, a tractor-trailer commutes 160,000 miles across America.

a. Assuming a trucker changes his tires every 40,000 miles, and that he starts with a brand new set of tires, how many sets of tires will he use in a year?

$160000 \div 40000$

$= 160000 \div 10000 \div 4$

$= 16 \div 4$

$= 4$

4 sets of tires

b. If the trucker changes the oil every 10,000 miles and he starts the year with a fresh oil change, how many times will he change the oil in a year?

$= 160000 \div 10000$

$= 16$

16 oil changes

Lesson 16: Use *divide by 10* patterns for multi-digit whole number division.
Date: 7/4/13

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2.E.15

Name _____   Date _____

1. Estimate the quotient for the following problems. The first one is done for you.

a. 821 ÷ 41 ≈ 800 ÷ 40 = 20	b. 617 ÷ 23 ≈ _600_ ÷ _20_ = _30_	c. 821 ÷ 39 ≈ _800_ ÷ _40_ = _20_
d. 482 ÷ 52 ≈ _500_ ÷ _50_ = _10_	e. 531 ÷ 48 ≈ _500_ ÷ _50_ = _10_	f. 141 ÷ 73 ≈ _100_ ÷ _100_ = _1_
g. 476 ÷ 81 ≈ _500_ ÷ _100_ = _5_	h. 645 ÷ 69 ≈ _700_ ÷ _70_ = _10_	i. 599 ÷ 99 ≈ _600_ ÷ _100_ = _6_
j. 301 ÷ 26 ≈ _300_ ÷ _30_ = _10_	k. 729 ÷ 81 ≈ _700_ ÷ _100_ = _7_	l. 636 ÷ 25 ≈ _600_ ÷ _60_ = _10_

m. 835 ÷ 89	n. 345 ÷ 72	o. 559 ÷ 11
≈ _900_ ÷ _90_ = _10_	≈ _350_ ÷ _100_ = _3.5_	≈ _600_ ÷ _10_ = _60_

2. Mrs. Johnson spent $611 buying lunch for 78 students. If all of the lunches were the same cost, about how much did she spend on each lunch?

$$611 \div 78$$
$$\approx 600 \div 100$$
$$= 6$$

About $6

3. An oil well produces 172 gallons of oil every day. A standard oil barrel holds 42 gallons of oil. About how many barrels of oil will the well produce in one day? Explain your thinking.

$$172 \div 42$$
$$\approx 200 \div 50$$
$$= 4$$

About 4 barrels

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Lesson 17:   Use basic facts to approximate quotients with two-digit divisors.
Date: 7/4/13

engage^{ny}   2.E.26

Name _____   Date _____

1. Estimate the quotient for the following problems. The first one is done for you.

a. $8,328 \div 41$ $\approx 8,000 \div 40$ $= 200$	b. $2,109 \div 23$ $\approx 2000 \div 20$ $= 100$	c. $8,215 \div 38$ $\approx 8000 \div 40$ $= 200$
d. $3,861 \div 59$ $\approx 3600 \div 60$ $= 60$	e. $2,899 \div 66$ $\approx 2800 \div 70$ $= 40$	f. $5,576 \div 92$ $\approx 5600 \div 100$ $= 56$
g. $5,086 \div 73$ $\approx 4900 \div 70$ $= 70$	h. $8,432 \div 81$ $\approx 8800 \div 80$ $= 110$	i. $9,032 \div 89$ $\approx 9000 \div 90$ $= 100$
j. $2,759 \div 48$ $\approx 3000 \div 50$ $= 60$	k. $8,194 \div 91$ $\approx 8100 \div 90$ $= 90$	l. $4,368 \div 63$ $\approx 4200 \div 60$ $= 70$
m. $6,537 \div 74$ $\approx 6300 \div 70$ $= 90$	n. $4,998 \div 48$ $\approx 5000 \div 50$ $= 100$	o. $6,106 \div 25$ $\approx 6000 \div 30$ $= 200$

2. 91 boxes of apples hold a total of 2,605 apples. Assuming each box has about the same number of apples, estimate the number of apples in each box.

$2605 \div 91$

$\approx 2700 \div 90$

$= 30$

About 30 apples in each box

3. A wild tiger can eat up to 55 pounds of meat in a day. About how many days would it take for a tiger to eat the following prey?

Prey	Weight of Prey	Number of Days
Eland Antelope	1,754 pounds	30
Boar	661 pounds	11
Chital Deer	183 pounds	3
Water Buffalo	2,322 pounds	40

$1754 \div 55$

$\approx 1800 \div 60$

$= 30$

$661 \div 55$

$\approx 660 \div 60$

$= 11$

$183 \div 55$

$\approx 180 \div 60$

$= 3$

$2322 \div 55$

$\approx 2400 \div 60$

$= 40$

Name _____   Date _____

1. Divide, then check using multiplication. The first one is done for you.

   a. $71 \div 20$

   $$\begin{array}{r} 3 \quad \text{R } 11 \\ 2\;0\overline{\smash{\big)}\,7\;1} \\ 6\;0 \\ \hline 1\;1 \end{array}$$

   Check:

   $20 \times 3 = 60$

   $60 + 11 = 71$

   b. $90 \div 40$

   $$\begin{array}{r} 2\; r\,10 \\ 40\overline{\smash{\big)}\,90} \\ -80 \\ \hline 10 \end{array}$$

   $40 \times 2 = 80$

   $80 + 10 = 90$

   c. $95 \div 60$

   $$\begin{array}{r} 1\; R\,35 \\ 60\overline{\smash{\big)}\,95} \\ -60 \\ \hline 35 \end{array}$$

   $60 \times 1 = 60$

   $60 + 35 = 95$

   d. $280 \div 30$

   $$\begin{array}{r} 9\; R\,10 \\ 30\overline{\smash{\big)}\,280} \\ -270 \\ \hline 10 \end{array}$$

   $30 \times 9 = 270$

   $270 + 10 = 280$

   e. $437 \div 60$

   $$\begin{array}{r} 7\; R\,17 \\ 60\overline{\smash{\big)}\,437} \\ -420 \\ \hline 17 \end{array}$$

   $60 \times 7 = 420$

   $420 + 17 = 437$

   f. $346 \div 80$

   $$\begin{array}{r} 4\; R\,26 \\ 80\overline{\smash{\big)}\,346} \\ -320 \\ \hline 26 \end{array}$$

   $80 \times 4 = 320$

   $320 + 26 = 346$

Lesson 19:   Divide two- and three-digit dividends by multiples of 10 with single-digit quotients and make connections to a written method.
Date: 7/4/13

engage^ny   2.F.11

2. A number divided by 40 has a quotient of 6 with a remainder of 16. Find the number.

6 R 16

40) ?

$40 \times 6 = 240$

$240 + 16 = 256$

3. A shipment of 288 reams of paper was delivered. Each of the 30 classrooms received an equal share of the paper. Any extra reams of paper were stored. After the paper was distributed to the classrooms, how many reams of paper were stored?

9 R 18

30) 288
    −270
      18

Each classroom received 9 reams of paper.
The remaining 18 reams were stored.

4. How many sixties are in two hundred forty-four?

4 R 4

60) 244
    −240
       4

There are 4 sixties in 244. There will be 4 left over.

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Lesson 19:   Divide two- and three-digit dividends by multiples of 10 with single-
          digit quotients and make connections to a written method.
Date: 7/4/13

engage^ny   **2.F.12**

Name _____   Date _____

1. Divide. Then, check with multiplication. The first one is done for you.

a.   72 ÷ 31

```
        2  R  10
  3 1 | 7  2
      - 6  2
        1  0
```

Check:

31 × 2 = 62

62 + 10 = 72

b.   89 ÷ 21

```
         4 R5
  21 ) 89
      -84
        5
```

Check:

21 × 4 = 84

84 + 5 = 89 ✔

c.   94 ÷ 33

```
        2 R28
  33 ) 94
      -66
        28
```

Check:

$$33 \begin{matrix} \times 2 \\ \overline{66} \end{matrix} \Big\} \quad 66 \begin{matrix} +28 \\ \overline{94} \end{matrix}$$

✔

d.   67 ÷ 19

```
         3
  19 ) 67
      -57
        10
```

Check:

$$19 \begin{matrix} \times 3 \\ \overline{57} \end{matrix} \Big\} \quad 57 \begin{matrix} +10 \\ \overline{67} \end{matrix}$$

✔

e.   79 ÷ 25

```
        3 R4
  25 ) 79
      -75
        4
```

Check:

$$25 \begin{matrix} \times 3 \\ \overline{75} \end{matrix} \Big\} \quad 75 \begin{matrix} + 4 \\ \overline{79} \end{matrix}$$

✔

f.   83 ÷ 21

```
         3 R20
  21 ) 83
      -63
        20
```

Check:

$$21 \begin{matrix} \times 3 \\ \overline{63} \end{matrix} \Big\} \quad 63 \begin{matrix} +20 \\ \overline{83} \end{matrix}$$

✔

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Lesson 20:   Divide two- and three-digit dividends by two-digit divisors with single
digit quotients, and make connections to a written method.

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2. A 91 square foot bathroom has a length of 13 feet. What is the width of the bathroom?

13ft $\boxed{A=91 \text{ sq ft}}$

? ft

$13\overline{)91}$
$\quad -91$
$\quad\quad 0$

7
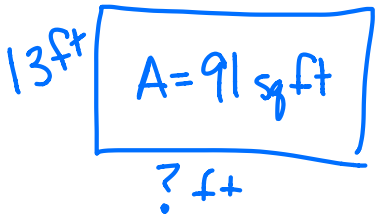
The width is 7 feet.

3. While preparing for a morning conference, Principal Corsetti is laying out 8 dozen bagels on square plates. Each plate can hold 14 bagels.

   a. How many plates of bagels will Mr. Corsetti have?

12
× 8
96 bagels

$14\overline{)96}$
$\quad -84$
$\quad\quad 12$

6 R 12

He will have 7 plates.

   b. How many more bagels would be needed to fill the final plate with bagels?

The final plate has 12 bagels, so he will need two more bagels.

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Lesson 20: Divide two- and three-digit dividends by two-digit divisors with single digit quotients, and make connections to a written method.

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Name _____   Date _____

1. Divide, then check using multiplication. The first one is done for you.

   a. 129 ÷ 21

   $$\begin{array}{r} 6 \quad \text{R }3 \\ 2\;1\,\overline{)1\;\;2\;\;9} \\ -\;\;1\;\;2\;\;6 \\ \hline 3 \end{array}$$

   Check:

   21 × 6 = 126

   126 + 3 = 129

   b. 158 ÷ 37

   $$\begin{array}{r} 4 \;\;\text{R}10 \\ 37\,\overline{)158} \\ -\;14\;8 \\ \hline 10 \end{array}$$

   37 × 4 = 148
   148 + 10 = 158

   c. 261 ÷ 49

   $$\begin{array}{r} 5\;\text{R}16 \\ 49\,\overline{)261} \\ -245 \\ \hline 16 \end{array}$$

   49 × 5 = 245
   245 + 16 = 261

   d. 574 ÷ 82

   $$\begin{array}{r} 7\;\text{R}0 \\ 82\,\overline{)574} \\ -574 \\ \hline 0 \end{array}$$

   82 × 7 = 574

   e. 464 ÷ 58

   $$\begin{array}{r} 8 \\ 58\,\overline{)464} \\ -464 \\ \hline 0 \end{array}$$

   58 × 8 = 464

   f. 640 ÷ 9

   $$\begin{array}{r} 70\;\text{R}10 \\ 9\,\overline{)640} \\ -630 \\ \hline 10 \end{array}$$

   70 × 9 = 630
   630 + 10 = 640

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Lesson 21: Divide two- and three-digit dividends by two-digit divisors with single-digit quotients and make connections to a written method.
Date: 7/4/13

engage^ny   2.F.35

2. It takes Juwan exactly 35 minutes by car to get to his grandmother's. The nearest parking area is a 4-minute walk from her apartment. One week he visited more often. He realized that he spent 5 hours and 12 minutes traveling to her apartment and then back home. How many round trips did he make to visit his grandmother?

$$\begin{array}{r} 60 \\ \times\ 5 \\ \hline 300 \end{array}$$

$$300 + 12 = 312$$

$$\begin{array}{r} 8 \\ 39\overline{)312} \\ -312 \\ \hline 0 \end{array}$$

8 trips → 4 round trips

3. How many eighty-fours are in 672?

$$\begin{array}{r} 8 \\ 84\overline{)672} \\ -672 \\ \hline 0 \end{array}$$

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Lesson 21: Divide two- and three-digit dividends by two-digit divisors with single-digit quotients and make connections to a written method.

Date: 7/4/13

engage^{ny}   **2.F.36**

Name _____   Date _____

1. Divide. Then, check using multiplication. The first one is done for you.

   a. 487 ÷ 21

   ```
              2  3  R 4        Check:
      2 1 | 4  8  7
        -   4  2               21 × 23 = 483
            6  7
          - 6  3               483 + 4 = 487
               4
   ```

   b. 485 ÷ 15

   ```
            3 2 R5       Check:
     15)4 8 5            32    > 480
       -4 5              x 15  ⌐ + 5
        3 5             ----- ⌐ -----
       -3 0              480      485    ✓
          5
   ```

   c. 700 ÷ 21

   ```
            3 3 R7       Check:
     21)7 0 0            33     > 693
       -6 3              x 21   ⌐ + 7
        7 0             -----   ⌐ -----
       -6 3              693      700    ✓
          7
   ```

   d. 399 ÷ 31

   ```
            1 2 R27      Check:
     31)3 9 9            31     > 372
       -3 1              x 12   ⌐ + 27
        8 9             -----   ⌐ -----
       -6 2              372      399    ✓
         27
   ```

Lesson 22:   Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotients, reasoning about the decomposition of successive remainders in each place value.

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e. 820 ÷ 42

$$\begin{array}{r} 19\,R22 \\ 42\overline{)820} \\ -42\downarrow \\ \hline 400 \\ -378 \\ \hline 22 \end{array}$$

Check:

$$\begin{array}{r} 42 \\ \times\ 19 \\ \hline 798 \end{array} \Big\rangle \begin{array}{r} 798 \\ +\ 22 \\ \hline 820 \end{array} \checkmark$$

f. 908 ÷ 56

$$\begin{array}{r} 16\,R12 \\ 56\overline{)908} \\ -56 \\ \hline 348 \\ -336 \\ \hline 12 \end{array}$$

Check:

$$\begin{array}{r} 56 \\ \times16 \\ \hline 896 \end{array} \Big\rangle \begin{array}{r} 896 \\ +\ 12 \\ \hline 908 \end{array} \checkmark$$

2. When dividing 878 by 31, a student finds a quotient of 28 with a remainder of 11. Check the student's work, and use the check to find the error in the solution.

$$\begin{array}{r} 28\,R10 \\ 31\overline{)878} \\ 62 \\ \hline 258 \\ -248 \\ \hline 10 \end{array}$$

Check

$$\begin{array}{r} 31 \\ \times28 \\ \hline 868 \end{array} \Big\rangle \begin{array}{r} 868 \\ +\ 10 \\ \hline 878 \end{array}$$

The remainder should be 10, not 11.

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Lesson 22: Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotients, reasoning about the decomposition of successive remainders in each place value.

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Name _____   Date _____

1. Divide. Then, check using multiplication.

a. 9,962 ÷ 41

$$242 \text{ R}40$$

$$41 \overline{)9962}$$
$$-82$$
$$176$$
$$-164$$
$$122$$
$$-82$$
$$40$$

Check

$$242$$
$$\times \ 41$$
$$242$$
$$+9680$$
$$9922$$

$$9922$$
$$+ \ 40$$
$$9962 \checkmark$$

b. 1,495 ÷ 45

$$33 \text{ R}10$$

$$45 \overline{)1495}$$
$$-135$$
$$145$$
$$-135$$
$$10$$

Check

$$33$$
$$\times 45$$
$$165$$
$$+1320$$
$$1485$$

$$1485$$
$$+ \ 10$$
$$1495 \checkmark$$

c. 6,691 ÷ 28

$$238 \text{ R}27$$

$$28 \overline{)6691}$$
$$-56$$
$$109$$
$$-84$$
$$251$$
$$-224$$
$$27$$

Check

$$238$$
$$\times \ 28$$
$$1904$$
$$+4760$$
$$6664$$

$$6664$$
$$+ \ 27$$
$$6691 \checkmark$$

d. 2,625 ÷ 32

$$82 \text{ R}1$$

$$32 \overline{)2625}$$
$$-256$$
$$65$$
$$-64$$
$$1$$

Check

$$82$$
$$\times \ 32$$
$$164$$
$$+2460$$
$$2624$$

$$2624$$
$$+ \quad 1$$
$$2625 \checkmark$$

e. 2,409 ÷ 19

$$126 \text{ R}15$$

$$19 \overline{)2409}$$
$$-19$$
$$50$$
$$-38$$
$$129$$
$$-114$$
$$15$$

Check

$$126$$
$$\times \ 19$$
$$1134$$
$$+1260$$
$$2394$$

$$2394$$
$$+ \ 15$$
$$2409 \checkmark$$

f. 5,821 ÷ 62

$$93 \text{ R}55$$

$$62 \overline{)5821}$$
$$-558$$
$$241$$
$$-186$$
$$55$$

Check

$$93$$
$$\times \ 62$$
$$186$$
$$+5580$$
$$5766$$

$$5766$$
$$+ \ 55$$
$$5821 \checkmark$$

Lesson 23:   Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotients, reasoning about the decomposition of successive remainders in each place value.

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2. A political gathering in South America was attended by 7,910 people. Each of South America's 14 countries was equally represented. How many representatives attended from each country?

$$
\begin{array}{r}
565 \\
14\overline{)7910} \\
-70 \\
\hline
91 \\
-84 \\
\hline
70 \\
-70 \\
\hline
0
\end{array}
$$

There were 565 representatives from each country.

3. A candy company packages caramel into containers that hold 32 fluid ounces. In the last batch, 1,848 fluid ounces of caramel were made. How many containers were needed for this batch?

$$
\begin{array}{r}
57\,R24 \\
32\overline{)1848} \\
-160 \\
\hline
248 \\
-224 \\
\hline
24
\end{array}
$$

The candy company will need 58 containers. 57 will be full. The 58th container will only have 24 fluid ounces.

Lesson 23: Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotients, reasoning about the decomposition of successive remainders in each place value.

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Name _____   Date _____

1. Divide. Show every other division sentence in two steps. The first two have been done for you.

    a. $1.8 \div 6 = 0.3$

    b. $1.8 \div 60 = (1.8 \div 6) \div 10 = 0.3 \div 10 = 0.03$

    c. $2.4 \div 8 = $ __0.3__

    d. $2.4 \div 80 = $ __$(2.4 \div 8) \div 10 = 0.3 \div 10 = 0.03$__

    e. $14.6 \div 2 = $ __7.3__

    f. $14.6 \div 20 = $ __$(14.6 \div 2) \div 10 = 7.3 \div 10 = 0.73$__

    g. $0.8 \div 4 = $ __0.2__

    h. $80 \div 400 = $ __$(80 \div 4) \div 100 = 20 \div 100 = 0.2$__

    i. $0.56 \div 7 = $ __0.08__

    j. $0.56 \div 70 = $ __$(0.56 \div 7) \div 10 = 0.08 \div 10 = 0.008$__

    k. $9.45 \div 9 = $ __1.05__

    l. $9.45 \div 900 = $ __$(9.45 \div 9) \div 100 = 1.05 \div 100 = 0.0105$__

Lesson 24: Divide decimal dividends by multiples of 10, reasoning about the placement of the decimal point and making connections to a written method.

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2. Use place value reasoning and the first quotient to compute the second quotient. Use place value to explain how you placed the decimal point.

a. $65.6 \div 80 = 0.82$

$65.6 \div 8 =$ ___8.2___

b. $2.5 \div 50 = 0.05$

$2.5 \div 5 =$ ___0.5___

c. $19.2 \div 40 = 0.48$

$19.2 \div 4 =$ ___4.8___

d. $39.6 \div 6 = 6.6$

$39.6 \div 60 =$ ___0.66___

Lesson 24:   Divide decimal dividends by multiples of 10, reasoning about the placement of the decimal point and making connections to a written method.

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3. Chris rode his bike along the same route every day for 60 days. He logged that he had gone exactly 127.8 miles.

    a. How many miles did he bike each day? Show your work to explain how you know.

    $127.8 \div 60 = (127.8 \div 6) \div 10 = 21.3 \div 10 = 2.13$

    He biked 2.13 miles each day.

    b. How many miles did he bike over the course of two weeks?

    $$\begin{array}{r}
    \overset{1}{2}.13 \\
    \times \quad 14 \\
    \hline
    852 \\
    + \; 2130 \\
    \hline
    29.82
    \end{array}$$

    He biked 29.82 miles in two weeks.

4. 2.1 liters of coffee were equally distributed to 30 cups. How many milliliters of coffee were in each cup?

    $2.1 \div 30 = (2.1 \div 3) \div 10 = 0.7 \div 10 = 0.07$

    Each cup has 0.07 liters of coffee.

    $0.07 \, L = 70 \, mL$

    Each cup has 70 mL of coffee

Lesson 24: Divide decimal dividends by multiples of 10, reasoning about the placement of the decimal point and making connections to a written method.

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Name _____   Date _____

1. Estimate the quotients.

   a. $3.53 \div 51 \approx$ $3.5 \div 50 = 3.5 \div 5 \div 10 = 0.7 \div 10 = \boxed{0.07}$

   b. $24.2 \div 42 \approx$ $24 \div 40 = 24 \div 4 \div 10 = 6 \div 10 = \boxed{0.6}$

   c. $9.13 \div 23 \approx$ $10 \div 20 = 10 \div 2 \div 10 = 5 \div 10 = \boxed{0.5}$

   d. $79.2 \div 39 \approx$ $80 \div 40 = \boxed{2}$

   e. $7.19 \div 58 \approx$ $7.2 \div 60 = 7.2 \div 6 \div 10 = 1.2 \div 10 = \boxed{0.12}$

2. Estimate the quotient in (a). Use your estimated quotient to estimate (b) and (c).

   a. $9.13 \div 42 \approx$ $9.2 \div 40 = 9.2 \div 4 \div 10 = 2.3 \div 10 = \boxed{0.23}$

   b. $913 \div 42 \approx$ 23

   c. $91.3 \div 42 \approx$ 2.3

COMMON CORE   Lesson 25:   Use basic facts to approximate decimal quotients with two-digit divisors reasoning about the placement of the decimal point.   engage^ny   2.G.23

Date: 7/4/13

3. Mrs. Huynh bought a bag of 3 dozen toy animals as party favors for her son's birthday party for $28.97. Estimate the price of each toy animal.

$$\begin{array}{r} \overset{1}{1}2 \\ \times\ 3 \\ \hline 36 \end{array}$$

$28.97 \div 36 \approx 28 \div 40 = 28 \div 4 \div 10 = 7 \div 10 = 0.7$

Each toy is about 70¢.

4. Carter drank 15.75 gallons of water in 4 weeks. He drank the same amount of water each day.

a. Estimate how many gallons he drank in one day.

$15.75 \div 4 \approx 16 \div 4 = 4$ in a week

$4 \div 7 \approx 4 \div 8 = 0.5$ → About 0.5 gallons each day.

b. Estimate how many gallons he drank in one week.

$15.75 \div 4 \approx 16 \div 4 = 4$ in each week

c. About how many days altogether will it take him to drink 20 gallons?

4 gallons each week × ⟨5⟩ = 20 gallons

It will take about 5 weeks, which is 35 days.

NOTE: Because students are being asked to estimate, each problem may have multiple correct "answers".

COMMON CORE | Lesson 25: | Use basic facts to approximate decimal quotients with two-digit divisors reasoning about the placement of the decimal point. | engage^ny | **2.G.24**
| Date: | 7/4/13 |

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Name _____   Date _____

1. Create two whole number division problems that have a quotient of 9 and a remainder of 5. Justify which is greater using decimal division.

$$8\overline{)77}\ \ \ 9\ R5$$

$$10\overline{)95}\ \ \ 9\ R5$$

$$8\overline{)77.000}\ \ \ 9.625$$
$$-72$$
$$50$$
$$-48$$
$$20$$
$$-16$$
$$40$$
$$-40$$
$$0$$

$$10\overline{)95.0}\ \ \ 9.5$$
$$-90$$
$$50$$
$$-50$$
$$0$$

> $8\overline{)77}$ is greater than $10\overline{)95}$

2. Divide. Then, check your work with multiplication.

   a.   75.9 ÷ 22

$$22\overline{)75.9}\ \ \ 3.45$$
$$-66$$
$$99$$
$$-88$$
$$110$$
$$-110$$
$$0$$

$$\begin{array}{r} 3.45 \\ \times\ \ 22 \\ \hline 1\,6\,9\,0 \\ 6\,9\,0\,0 \\ \hline 7\,5.9\,0 \end{array}$$

   b.   97.28 ÷ 19

$$19\overline{)97.28}\ \ \ 5.12$$
$$95$$
$$22$$
$$-19$$
$$38$$
$$-38$$
$$0$$

$$\begin{array}{r} 5.12 \\ \times\ \ 19 \\ \hline 4\,6\,0\,8 \\ +5\,1\,2\,0 \\ \hline 9\,7.2\,8 \end{array}$$

   c.   77.14 ÷ 38

$$38\overline{)77.14}\ \ \ 2.03$$
$$-76$$
$$114$$
$$-114$$
$$0$$

$$\begin{array}{r} 2.03 \\ \times\ \ 38 \\ \hline 1\,6\,2\,4 \\ +6\,0\,9\,0 \\ \hline 7\,7.1\,4 \end{array}$$

   d.   12.18 ÷ 29

$$29\overline{)12.18}\ \ \ 0.42$$
$$-116$$
$$58$$
$$-58$$
$$0$$

$$\begin{array}{r} 0.42 \\ \times\ \ 29 \\ \hline 3\,7\,8 \\ 8\,4\,0 \\ \hline 1\,2.1\,8 \end{array}$$

Lesson 26:   Divide decimal dividends by two-digit divisors, estimating quotients, reasoning about the placement of the decimal point, and making connections to a written method.

3. Divide.

a. 97.58 ÷ 34

$$\begin{array}{r} 2.87 \\ 34\overline{)97.58} \\ -68 \\ \hline 295 \\ -272 \\ \hline 238 \\ -238 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 2.87 \\ \times\quad 34 \\ \hline 1148 \\ +8610 \\ \hline 97.58 \end{array}$$

b. 55.35 ÷ 45

$$\begin{array}{r} 1.23 \\ 45\overline{)55.35} \\ -45 \\ \hline 103 \\ -90 \\ \hline 135 \\ -135 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 1.23 \\ \times\quad 45 \\ \hline 615 \\ +4920 \\ \hline 55.35 \end{array}$$

4. Use the equations on the left to solve the problems on the right. Explain how you decided where to place the decimal in the quotient.

a. 520.3 ÷ 43 = 12.1   52.03 ÷ 43 = __1.21__

The dividend is 10 times smaller, so the quotient will be 10 times smaller, too.

b. 19.08 ÷ 36 = 0.53   190.8 ÷ 36 = __5.3__

The dividend is 10 times bigger, so the quotient will be 10 times bigger, too.

Lesson 26:   Divide decimal dividends by two-digit divisors, estimating quotients, reasoning about the placement of the decimal point, and making connections to a written method.

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5. You can look up information on the world's tallest buildings at
    http://www.infoplease.com/ipa/A0001338.html.

    a. The Aon Centre in Chicago, Illinois, is one of the world's tallest buildings. Built in 1973, it is 1,136 feet
        high and has 80 stories. If each story is of equal height, how tall is each story?

$$
\begin{array}{r}
14.2 \\
80\overline{)1136.0} \\
-80 \quad\ \ \\
\overline{336} \quad \\
-320 \quad\ \\
\overline{160} \\
-160 \\
\overline{0}
\end{array}
$$

Each story is 14.2 feet tall.

    b. Burj al Arab Hotel, another one of the world's tallest buildings, was finished in 1999. Located in
        Dubai, it is 1,053 feet high with 60 stories. If each floor is the same height, how much taller or shorter
        is each floor than the height of the floors in the Aon Center?

$$
\begin{array}{r}
17.55 \\
60\overline{)1053.00} \\
-60 \quad\ \ \ \\
\overline{453} \quad\ \\
-420 \quad\ \\
\overline{330} \ \\
-300 \ \\
\overline{300} \\
-300 \\
\overline{0}
\end{array}
$$

Each story is 17.55 feet tall.

$$
\begin{array}{r}
17.55 \\
-14.2 \\
\hline
3.35
\end{array}
$$

The floors of the Burj al Arab Hotel are 3.35 feet taller than the floors of the Aon Center.

Lesson 26:   Divide decimal dividends by two-digit divisors, estimating quotients,
reasoning about the placement of the decimal point, and making
connections to a written method.

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Name _____   Date _____

1. Divide and check.

a. 7 ÷ 28

$$28\overline{)7.00}$$
  .25
  −56
  140
  −140
    0

0.25
× 28
200
+500
7.00

c. 6.5 ÷ 13

$$13\overline{)6.5}$$
  .5
  −65
    0

13
× .5
6.5

e. 561.68 ÷ 28

$$28\overline{)561.68}$$
  20.06
  −56
  0168
  −168
    0

20.06
× 28
16048
+40120
561.68

b. 51 ÷ 25

$$25\overline{)51.00}$$
  2.04
  −50
  100
  −100
    0

2.04
× 25
1020
+4080
51.00

d. 132.16 ÷ 16

$$16\overline{)132.16}$$
  8.26
  −128
   41
   −32
    96
   −96
     0

8.26
× 16
4956
+8260
132.16

f. 604.8 ÷ 36

$$36\overline{)604.8}$$
  16.8
  −36
  244
  −216
   288
  −288
    0

16.8
× 36
1008
5040
604.8

2. In a science class, students water a plant with the same amount of water each day for 28 consecutive days. If the students use a total of 23.8 liters of water over the 28 days, how many liters of water did they use each day? How many milliliters did they use each day?

$$28\overline{)23.80}$$
  .85
  −224
   140
  −140
     0

They use 0.85 L each day.

0.85 L = 850 ml

COMMON CORE

Lesson 27: Divide decimal dividends by two-digit divisors, estimating quotients, reasoning about the placement of the decimal point, and making connections to a written method.

Date: 7/4/13

engage^ny

2.G.48

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3. A seamstress has a piece of cloth that is 3 yards long. She cuts it into shorter lengths of 16 inches each.
    How many of the shorter pieces can she cut?

$$
\begin{array}{r}
36 \\
\times\ 3 \\
\hline
108
\end{array}
$$

$$
\begin{array}{r}
6 \\
16\overline{)108} \\
-96 \\
\hline
12
\end{array}
$$

She can cut 6 of the shorter pieces.

4. Jenny filled 12 pitchers with an equal amount of lemonade in each. The total amount of lemonade in the
    12 pitchers was 41.4 liters. How much lemonade would be in 7 pitchers?

$$
\begin{array}{r}
3.45 \\
12\overline{)41.40} \\
-36 \\
\hline
54 \\
-48 \\
\hline
60 \\
-60 \\
\hline
0
\end{array}
$$

$$
\begin{array}{r}
3.45 \\
\times\ \ \ 7 \\
\hline
24.15
\end{array}
$$

24.15 liters in the seven pitchers.

Lesson 27:   Divide decimal dividends by two-digit divisors, estimating quotients,
reasoning about the placement of the decimal point, and making
connections to a written method.
Date: 7/4/13

2.G.49

Name _____   Date _____

1. Mr. Rice needs to replace the 166.25 ft of edging on the flower beds in his backyard. The edging is sold in length of 19 ft each. How many lengths of edging will he need to purchase?

19 | 19 | 19 | · · · · ·

166.25 feet
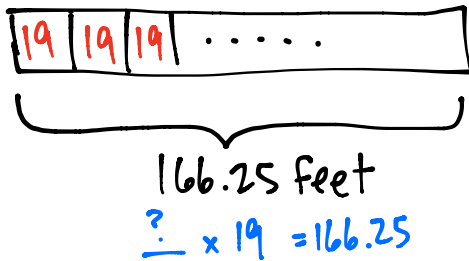
? x 19 = 166.25

$$\begin{array}{r} 8.75 \\ 19\overline{)166.25} \\ -152 \\ \hline 142 \\ -133 \\ \hline 95 \\ -95 \\ \hline 0 \end{array}$$

He will need to buy 9 lengths.

2. Olivia is making granola bars and will use 17.9 oz of pistachios, 12.6 oz of almonds, 12.5 oz of sunflower seeds, and 12.5 oz of cashews. This amount makes 25 bars. What is the total amount of nuts in each bar?

$$\begin{array}{r} 17.9 \\ 12.6 \\ 12.5 \\ +\,12.5 \\ \hline 55.5 \end{array}$$

$$\begin{array}{r} 2.22 \\ 25\overline{)55.50} \\ -50 \\ \hline 55 \\ -50 \\ \hline 50 \\ -50 \\ \hline 0 \end{array}$$

There are 2.22 ounces in each bar.

3. Adam has 16.45 kg of flour and he uses 6.4 kg to make hot cross buns. The remaining flour is exactly enough to make 15 batches of scones. How much flour will be in each batch?

$$\begin{array}{r} 16.45 \\ -\;\;6.4 \\ \hline 10.05 \end{array}$$

$$\begin{array}{r} .67 \\ 15\overline{)10.05} \\ -90 \\ \hline 105 \\ -105 \\ \hline 0 \end{array}$$

there is 0.67 kg of flour in each batch.

4. There are 90 fifth grade students going on a field trip. Each one pays the teacher $9.25 to cover admission to the theater and lunch. Admission for the students will cost $315 and each one gets and equal amount to spend on lunch. How much will each fifth grader be able to spend on lunch?

$$
\begin{array}{r}
9.25 \\
\times \ 90 \\
\hline
832.50
\end{array}
\qquad
\begin{array}{r}
832.50 \\
-315.00 \\
\hline
517.50
\end{array}
$$

$$
\begin{array}{r}
5.75 \\
90\overline{)517.50} \\
450 \\
\hline
675 \\
630 \\
\hline
450 \\
-450 \\
\hline
0
\end{array}
$$

Each student gets $5.75 for lunch.

5. Ben is making math manipulatives to sell. He needs to make at least $450. Each manipulative costs $18 to make. He is selling them for $30 each. What is the minimum number he can sell to reach his goal?

$$
\begin{array}{r}
30 \\
-18 \\
\hline
12
\end{array}
$$

$12 profit on each item

$$
\begin{array}{r}
37.5 \\
12\overline{)450.0} \\
-36 \\
\hline
90 \\
-84 \\
\hline
60 \\
-60 \\
\hline
0
\end{array}
$$

He will need to sell 38 manipulatives

Lesson 28: Solve division word problems involving multi-digit division with group size unknown and the number of groups unknown.

Date: 7/4/13

engage ny

2.H.14

Name _____　　　Date _____

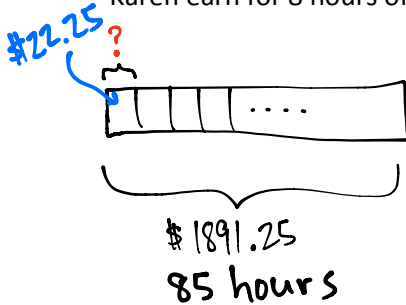Directions: Solve the word problems using the bar model.

1. Michelle wants to save $150 for a trip to Six Flags Amusement Park. If she saves $12 each week, how many weeks will it take her to save enough money for the trip?

12 | 12 | 12 | . . .

$150
? twelves

$$\begin{array}{r} 12.5 \\ 12\overline{)150.0} \\ -12 \\ \hline 30 \\ -24 \\ \hline 60 \\ -60 \\ \hline 0 \end{array}$$

It will take 13 weeks to save enough.

2. Karen works for 85 hours over a two week period. She earns $1,891.25 over this period. How much does Karen earn for 8 hours of work?

$22.25 ?

. . . .

$ 1891.25
85 hours

$$\begin{array}{r} 22.25 \\ 85\overline{)1891.25} \\ 170 \\ \hline 191 \\ -170 \\ \hline 212 \\ -170 \\ \hline 425 \\ -425 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 22.25 \\ \times\ \ \ \ 8 \\ \hline 178.00 \end{array}$$

$178

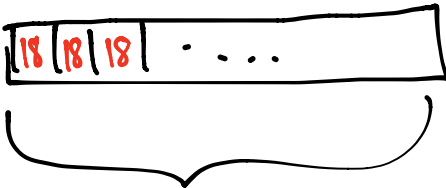3. The area of a rectangle is 256.5 m². If the length is 18 m, what is the perimeter of the rectangle?

18m | 256.5 m²

? m
14.25 m
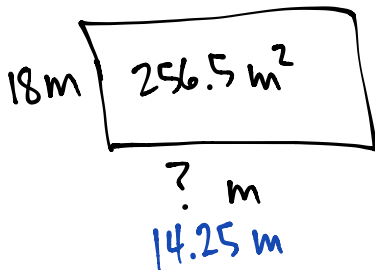
$$\begin{array}{r} 14.25 \\ 18\overline{)256.50} \\ 18 \\ \hline 76 \\ -72 \\ \hline 45 \\ -36 \\ \hline 90 \\ -90 \\ \hline 0 \end{array}$$

$(14.25 \times 2) + (18 \times 2)$

28.5 + 36

64.5 m

$$\begin{array}{r} 28.5 \\ +36 \\ \hline 64.5 \end{array}$$

4. Tyler baked 702 cookies. He sold them in boxes of 18. After selling all the boxes of cookies, he earned $136.50. What was the cost of one box of cookies?
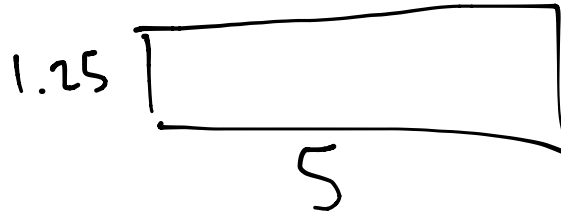
18 | 18 | 18 · · · ·

702 cookies
? boxes

```
    39 boxes
18 | 702
     54
     162
    −162
      0
```

```
     3.50
39 | 136.50
     117
     195
   − 195
      0
```

One box costs $3.50

5. A park is 4 times as long as it is wide. If the distance around the park is 12.5 kilometers, what is the area of the park?

1.25

5

length = 1 unit
width = 4 units
perimeter = 10 units

$12.5 \div 10 = 1.25$

Each unit is 1.25 km long.

```
  1.25
×    4
 5.00
```

```
   1.25
×     5
  6.25
```

Area is 6.25 km²