Name _____   Date _____

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

a. 23 × 20 Think: 23 ones × 2 tens = __46__ tens 23 × 20 = __460__	b. 230 × 20 Think: 23 tens × 2 tens = __46 hundreds__ 230 × 20 = __4,600__
c. 41 × 4 41 ones × 4 ones = 164 __ones__ 41 × 4 = __164__	d. 410 × 400 41 tens × 4 hundreds = 164 __thousands__ 410 × 400 = __164,000__
e. 3,310 × 300 __331__ tens × __3__ hundreds = 993 __thousands__ 3,310 × 300 = __993,000__	f. 500 × 600 __5__ hundreds × __6__ hundreds = 30 __ten thousands__ 500 × 600 = __300,000__

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.   6 tens = 2 tens × 3 tens

$60 = 20 \times 30$ __false__

$6 \times 10 = 60$

$2 \times 10 + 3 \times 10 = 20 \times 30 = 600$

b.   44 × 20 × 10 = 440 × 2   __false__

440×20

$44 \times 2 \times 10 \times 10 = 88 \times 100 = 8,800$

$440 \times 2 = 880$

c.   86 ones × 90 hundreds = 86 ones × 900 tens   True

$86 \times 9000 = 86 \times 9,000$

$86 \times 90 \times 100 = 86 \times 9000$

$= 774,000$

$86 \times 900 \times 10 = 86 \times 9,000$

$= 774,000$

d.   64 × 8 × 100 = 640 × 8 × 10   True

$6400 \times 8 = 6400 \times 8$

$64 \times 8 \times 100 = 512 \times 100 = 51,200$

$640 \times 8 \times 10 = 6400 \times 8 = 51,200$

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

$57 \times 2 \times 10 \times 10 \times 10 = 114 \times 1000$

$= 114,000$

e. $57 \times 2 \times 10 \times 10 \times 10 = 570 \times 2 \times 10$

$114,000 = 11,400$

$570 \times 2 \times 10 = 5700 \times 2$

$= 11,400$

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

a.	7×9	7×90	70×90	70×900
	$= 63$	$= 63 \times 10$	$= (7 \times 10) \times (9 \times 10)$	$= (7 \times 9) \times (10 \times 100)$
		$= 630$	$= (7 \times 9) \times 100$	$= 63,000$
			$= 6,300$	

b. 45×3 45×30 450×30 450×300

$= 135$

$= 135 \times 10$

$= 1350$

$= (45 \times 10) \times (3 \times 10)$

$= (45 \times 3) \times (100)$

$= 13,500$

$= (45 \times 10) \times (3 \times 100)$

$= (3 \times 45) \times (1000)$

$= 135,000$

c. 40×5 40×50 40×500 $400 \times 5,000$

$= 200$

$= (4 \times 10) \times (5 \times 10)$

$= 20 \times 100$

$= 2,000$

$= 4 \times 10 \times 5 \times 100$

$= 20 \times 1,000$

$= 20,000$

$= 4 \times 100 \times 5 \times 1000$

$= 20 \times 100,000$

$= 2,000,000$

d. 718×2 $7,180 \times 20$ $7,180 \times 200$ $71,800 \times 2,000$

$= 1,436$

$= (718 \times 10) \times (2 \times 10)$

$= 1,436 \times 100$

$= 143,660$

$= 718 \times 10 \times 2 \times 100$

$= 1,436 \times 1,000$

$= 1,436,000$

$= 718 \times 100 \times 2 \times 1000$

$= 1,436 \times 100,000$

$= 143,600,000$

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

4. Ripley told his mom that multiplying whole numbers by multiples of 10 was easy because you just count zeros in the factors and put them in the product. He used these two examples to explain his strategy.

$$7,000 \quad \times \quad 600 \quad = \quad 4,200,000 \qquad\qquad 800 \quad \times \quad 700 \quad = \quad 560,000$$
(3 zeros)   (2 zeros)   (5 zeros)   (2 zeros)   (2 zeros)   (4 zeros)
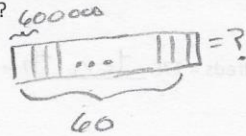
a. Ripley's mom said his strategy will not always work. Why not? Give an example.

$$500 \times 40 = 20,000$$
$$50 \times 20 = 1,000$$

If the factors give a product with extra zeros that strategy of counting zeros do not work.

5. The Canadian side of Niagara Falls has a flow rate of 600,000 gallons per second. How many gallons of water flow over the falls in 1 minute?
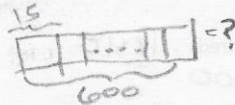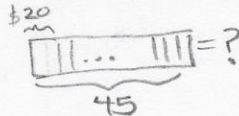
600 000 g/sec

1 min = 60 sec

$$\begin{array}{r} 600,000 \\ \times \quad 60 \\ \hline 36,000,000 \end{array}$$

36,000,000 gallons of water flow in one minute.

6. Tickets to a baseball game are $20 for an adult and $15 for a student. A school buys tickets for 45 adults and 600 students. How much money will the school spend for the tickets?

adults   tickets
45       $20

student
600      $15

$$\begin{array}{r} 45 \\ \times 20 \\ \hline 900 \end{array}$$

$$\begin{array}{r} 15 \\ \times 600 \\ \hline 9000 \end{array}$$

$$\begin{array}{r} 9,000 \\ + \ 900 \\ \hline 9,900 \end{array}$$

The school will spend $9,900

EUREKA MATH

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

3

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

      $43 \times 30 =$ 1,290

   b. 430×30

      Think: 43 tens × 3 tens = ___129___ hundreds

      $430 \times 30 =$ 12,900

   c. 830×20

      Think: 83 tens × 2 tens = 166 ___hundreds___

      $830 \times 20 =$ 16,600

   d. $4,400 \times 400$

      ___44___ hundreds × ___4___ hundreds = 176 ___ten thousands___

      $4,400 \times 400 =$ 1,760,000

   e. $80 \times 5,000$

      ___8___ tens × ___5___ thousands = 40 ___ten thousands___

      $80 \times 5,000 =$ 400,000

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

      $= 3,500 \quad = 3,500$

   b. $770 \times 6 = 77 \times 6 \times 100$ False

      $= 4620 \quad = 46,200$

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

      $= 500 \times 400 = 400 \times 500$

      $= 200,000 = 200,000$

   d. $24 \times 10 \times 90 = 90 \times 2,400$ false

      $= 240 \times 90 =$

      $= 21600 \quad = 216,000$

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

4

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

a. 5×5 5×50 50×50 50×500

   $= 25$ $= 25 \times 10$ $= (5 \times 10) \times (5 \times 10)$ $= (5 \times 5) \times (10 \times 100)$

                 $= 250$ $= (5 \times 5) \times 100$ $= 25{,}000$
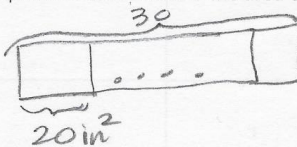
                                   $= 2{,}500$

b. 80×5 80×50 800×500 $8{,}000 \times 50$

   $= 400$ $= 40 \times 100$ $= 8 \times 100 \times 5 \times 100$ $= (8 \times 1{,}000) \times (5 \times 10)$

                 $= 4{,}000$ $= 40 \times 10{,}000$ $= 40 \times 10{,}000$

                                   $= 400{,}000$ $= 400{,}000$

c. 637×3 $6{,}370 \times 30$ $6{,}370 \times 300$ $63{,}700 \times 300$

   $= 1911$ $= (637 \times 10) \times (3 \times 10)$ $= (637 \times 10) \times (3 \times 100)$ $(637 \times 100) \times (3 \times 100)$

              $= 1911 \times 100$ $= 1911 \times 1{,}000$ $= 1911 \times 10{,}000$

              $= 191{,}100$ $= 1{,}911{,}000$ $= 19{,}110{,}000$

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

Stepping Stone	number of s s
20 in^2	30

30
20 in^2

$\begin{array}{r} 30 \\ \times\, 20 \\ \hline 600 \end{array}$

The area of 30 stones is 600 in^2

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

_____ $\times 10 = 42{,}300$ So

$42{,}300 \div 10 =$ _____ .

The number is $\boxed{4{,}230}$

$4{,}230 \times 500 =$ _____

$\begin{array}{r} 4{,}230 \\ \times\quad 500 \\ \hline 2{,}115{,}000 \end{array}$

4,230 multiplied by 500 gives a product of 2,115,000

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

5

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	•	Tenths	Hundredths	Thousandths
1,000,000	100,000	10,000	1,000	100	10	1	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$

millions to thousandths place value chart

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

Name _____   Date _____

1. Round the factors to estimate the products.

   a. 597 × 52 ≈ _____600_____ × _____50_____ = ___30,000___

   A reasonable estimate for 597 × 52 is ___30,000___.

   b. 1,103 × 59 ≈ _____1,000_____ × _____60_____ = ___60,000___

   A reasonable estimate for 1,103 × 59 is ___60,000___.

   c. 5,840 × 25 ≈ _____6,000_____ × _____30_____ = ___180,000___

   A reasonable estimate for 5,840 × 25 is ___180,000___.

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

Expressions	Rounded Factors	Estimate
a. 2,809 × 42	3,000 × 40	120,000
b. 28,090 × 420	30,000 × 400	12,000,000
c. 8,932 × 59	9,000 × 60	540,000
d. 89 tens × 63 tens 890 630	90 tens × 60 tens	540,000
e. 398 hundreds × 52 tens 39800 5200	400 hundreds × 50 tens	20,000,000 nds

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

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3. For which of the following expressions would 200,000 be a reasonable estimate? Explain how you know.

2,146 × 12	21,467 × 121	2,146 × 121	21,477 × 1,217
2,000×10	20,000×100	2,000×100	20,000×1000
20,000	2,000,000	200,000	20,000,000

4. Fill in the missing factors to find the given estimated product.

a. 571 × 43 ≈ ___600___ × ___40___ = 24,000

b. 726 × 674 ≈ ___700___ × ___700___ = 490,000

c. 8,379 × 541 ≈ ___8,000___ × ___500___ = 4,000,000

5. There are 19,763 tickets available for a New York Knicks home game. If there are 41 home games in a season, about how many tickets are available for all the Knicks' home games?

Tickets
19,763

Home games
41

19,763 ≈ 20,000

41 ≈ 40

20,000 × 40
= 800,000

There are about 800,000 tickets

6. Michael saves $423 dollars a month for college.

a. About how much money will he have saved after 4 years?

One month
Savings
$423

months
48

423 ≈ 400

48 ≈ 50

400
×50
‾‾‾‾
20,000

Michael will save about $20,000

b. Will your estimate be lower or higher than the actual amount Michael will save? How do you know?

$20,304

$20,000

My estimate is lower by $304

423
×48
‾‾‾‾
3384
1692
‾‾‾‾
20304

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

8

423
× 48
3354
1692
20304
exact

Name _____   Date _____

1. Round the factors to estimate the products.

   a. $697 \times 82 \approx$ ___*700*___ $\times$ ___*80*___ = ___*56,000*___

      A reasonable estimate for 697×82 is *56,000* .

   b. $5,897 \times 67 \approx$ ___*6,000*___ $\times$ ___*70*___ = ___*420,000*___

      A reasonable estimate for $5,897 \times 67$ is *420,000* .

   c. $8,840 \times 45 \approx$ ___*9,000*___ $\times$ ___*50*___ = ___*450,000*___

      A reasonable estimate for $8,840 \times 45$ is *450,000* .

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

Expressions	Rounded Factors	Estimate
a. $3,409 \times 73$	$3,000 \times 70$	210,000
b. $82,290 \times 240$	*80,000 x 200*	*16,000,000*
c. $9,832 \times 39$	*10,000 X 40*	*400,000*
d. 98 tens × 36 tens *980 360*	*100 tens X 40 tens*	*400,000 hundreds*
e. 893 hundreds × 85 tens *89300 850*	*900 hundreds x90 tens*	*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.

   $8,146 \times 12$ $81,467 \times 121$ $8,146 \times 121$ $81,477 \times 1,217$
   8000×10   *80,000 ×100*   *8,000×100*   *80,000 × 1,000*
   80,000   *8,000,000*   *800,000*   *80,000,000*

4. Fill in the blank with the missing estimate.

a. $751 \times 34 \approx$ ___800___ × ___30___ = 24,000

b. $627 \times 674 \approx$ ___660___ × ___700___ = 420,000

c. $7,939 \times 541 \approx$ ___8,000___ × ___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?

Tickets
42,362

Home games
81

$42,362 \approx 40,000$

$81 \approx 80$

$$\begin{array}{r} 40,000 \\ \times\ 80 \\ \hline 3,200,000 \end{array}$$

The Yankees sell 3,200,000 tickets

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?

Down Payment
$3,000

Save monthly
$340

$340 \approx 300$

$3,000 \div 300$

$30 \div 3 = 10$

Raphael will take 10 months

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

monthly
payment
$288

5 years
= 60 months

60

$$\boxed{|\ |\ |\ |\ |\ |} = ?$$
288

$$\begin{array}{r} {}^{5\ 4}288 \\ \times\ 60 \\ \hline 17,280 \end{array}$$

Raphael's total is $17,280

EUREKA MATH

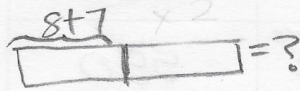Lesson 2: Estimate multi-digit products by rounding factors to a basic fact and using place value patterns.

10

Name _____ Date _____

1. Draw a model. Then, write the numerical expressions.

a. The sum of 8 and 7, doubled $2 \times (8+7)$	b. 4 times the sum of 14 and 26 $4 \times (14+26)$

a.
$8+7$ × 2

$\boxed{|} = ?$

$(8 \times 7) \times 2 =$
$15 \times 2 =$
30

b.
$14 + 26$

$\boxed{|||} = ?$

$(14+26) \times 4 =$
$40 \times 4 =$
160

c. 3 times the difference between 37.5 and 24.5
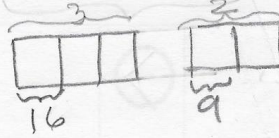
$3 \times (37.5 - 24.5)$
$37.5 - 24.5$

$\boxed{||} = ?$

$37.5 - 24.5$
$\begin{array}{r} 13 \\ \times 3 \\ \hline 39 \end{array}$
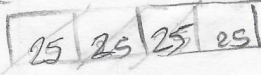
$\begin{array}{r} 37.5 \\ -24.5 \\ \hline 13.0 \end{array}$

d. The sum of 3 sixteens and 2 nines

$(3 \times 16) + (2 \times 9)$

$\underbrace{\boxed{||}}_{16}$ $\underbrace{\boxed{|}}_{9}$

$\begin{array}{r} 16 \\ \times 3 \\ \hline 48 \end{array}$

$\begin{array}{r} 9 \\ \times 2 \\ \hline 18 \end{array}$

$\begin{array}{r} 48 \\ +18 \\ \hline 66 \end{array}$

e. The difference between 4 twenty-fives and 3 twenty-fives
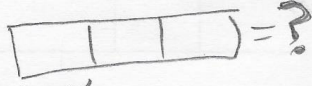
$(4 \times 25) - (3 \times 25)$

$\boxed{25 | 25 | 25 | 25}$

$(4-3) \times 25 =$
$1 \times 25 =$
25

f. Triple the sum of 33 and 27

$3 \times (33 + 27) =$
$3 \times (60) =$
180

$\boxed{||} = ?$

$\underbrace{33 + 27}$

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Lesson 3: Write and interpret numerical expressions and compare expressions using a visual model.

11

2. Write the numerical expressions in words. Then, solve.

Expression	Words	The Value of the Expression
a. 12 × (5 + 25) 12 × 30 360	Twelve times the total of five and twenty-five	360
b. (62 – 12) × 11 50 × 11 550	Eleven times the difference of sixty-two and twelve	550
c. (45 + 55) × 23 100 × 23 2300	Twenty-three times the sum of forty-five and fifty-five	2,300
d. (30 × 2) + (8 × 2) 60 + 16 76	The sum of two times thirty and eight times two.	76

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. 24 × (20 + 5) 24 > 12	⊳	(20 + 5) × 12
b. 18 × 27	⊲	20 twenty-sevens minus 1 twenty-seven (20 × 27) – (27) 19 × 27
c. 19 × 9	=	3 nineteens, tripled (3 × 19) × 3 9 × 19

4. Mr. Huynh wrote *the sum of 7 fifteens and 38 fifteens* on the board.

   Draw a model, and write the correct expression.
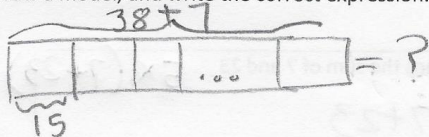
   $(7 \times 15) + (38 \times 15)$

   $(7 + 38) \times 15$

   45×15

   $$\begin{array}{r} \overset{2}{4}5 \\ \times 15 \\ \hline 225 \\ 45 \\ \hline 675 \end{array}$$

5. Two students wrote the following numerical expressions.

   Angeline: $(7 + 15) \times (38 + 15)$

   MeiLing: $15 \times (7 + 38)$

   Are the students' expressions equivalent to your answer in Problem 4? Explain your answer.

   Yes, they are. Both are correct. They are using the distributive property in different ways.

6. A box contains 24 oranges. Mr. Lee ordered 8 boxes for his store and 12 boxes for his restaurant.

   a. Write an expression to show how to find the total number of oranges ordered.

   Oranges   boxes

   24   8 + 12

   $24 \times (8 + 12) =$

   $24 \times 20 =$ 480 oranges

   b. Next week, Mr. Lee will double the number of boxes he orders. Write a new expression to represent the number of oranges in next week's order.

   $24 \times (8 + 12) \times 2 =$

   $24 \times 20 \times 2 =$

   $24 \times 40 =$ 860 oranges

   c. Evaluate your expression from Part (b) to find the total number of oranges ordered in both weeks.

   First week 480

   Second week 860
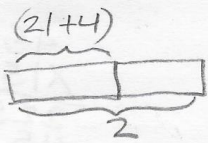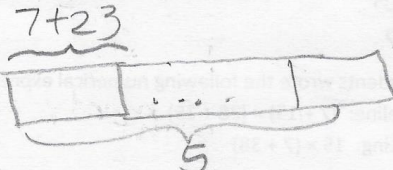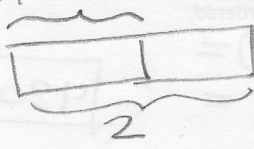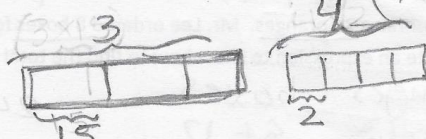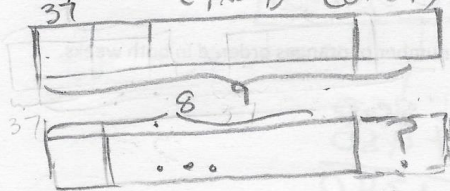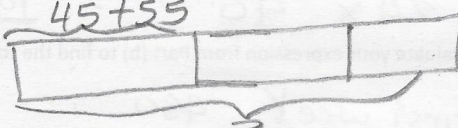
   $$\begin{array}{r} \overset{1}{8}60 \\ + 480 \\ \hline 1340 \end{array}$$

   the total number of oranges is 1,340

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Lesson 3:   Write and interpret numerical expressions and compare expressions using a visual model.

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Name _____ Date _____

1. Draw a model. Then, write the numerical expressions.

a. The sum of 21 and 4, doubled

$2 \times (21+4)$

$(21+4)$

2

$2 \times (21+4)$
$= 2 \times 25$
$= 50$

b. 5 times the sum of 7 and 23

$5 \times (7+23)$

$7+23$

5

$5 \times (7+23)$
$= 5 \times 30$
$= 150$

c. 2 times the difference between 49.5 and 37.5

$2 \times (49.5-37.5)$

$49.5-37.5$

2

$2 \times (49.5-37.5)$
$= 2 \times 12$
$= 24$

d. The sum of 3 fifteens and 4 twos

$(3 \times 15) + (4 \times 2)$

3

15

4

2

$(3 \times 15) + (4 \times 2)$
$= 45 + 8$
$= 53$

e. The difference between 9 thirty-sevens and 8 thirty-sevens

$(9 \times 37) - (8 \times 37)$

37

37

8

?

37

$(9 \times 37) - (8 \times 37)$
$37 \times (9-8)$
$37 \times 1 = 37$

f. Triple the sum of 45 and 55

$3 \times (45+55)$

$45+55$

3

$3 \times (45+55)$
$= 3 \times 100$
$= 300$

EUREKA MATH™

Lesson 3: Write and interpret numerical expressions and compare expressions using a visual model.

14

2. Write the numerical expressions in words. Then, solve.

Expression	Words	The Value of the Expression
a. 10 × (2.5 + 13.5) = 10 × 16 = 160	Ten times the sum of two and five tens and thirteen and five tens	160
b. (98 − 78) × 11 = 20 × 11 = 220	Eleven times the difference of ninety-eight and seventy-eight	220
(71 + 29) × 26 = 100 × 26 = 2,600	Twenty six times the sum of seventy-one and twenty-nine	2,600
c. (50 × 2) + (15 × 2) = 100 + 30 = 130	The sum of fifty times two and fifteen times two	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
93	>	39

b. 61 × 25	>	60 twenty-fives minus 1 twenty-five 60 × 25 − 25
61	>	59

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 wrong. 14 + 12 = 26 and 8 + 12 = 20
   26 times 20 is __520__, while 14 × 12 which is
   168 and 8 times 12 which is 96. is
   only __264__.

   These numbers may have the same
   digits but the operations are
   different.

   b. Which expression is greater? How much greater?

   (14 + 12) × (8 + 12) is greater than
   (14 × 12) + (8 × 12) by 256.

   $$\begin{array}{r} 520 \\ -264 \\ \hline 256 \end{array}$$

Name _____   Date _____

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

   a. **16 × 29**

      29 sixteens   16 × (30 − 1)   (15 − 1) × 29   (10 × 29) − (6 × 29)

   b. **38 × 45**

      (38 + 40) × (38 + 5)   (38 × 40) + (38 × 5)   45 × (40 + 2)   45 thirty-eights

   c. **74 × 59**

      74 × (50 + 9)   74 × (60 − 1)   (74 × 5) + (74 × 9)   59 seventy-fours

2. Solve using mental math. Draw a tape diagram and fill in the blanks to show your thinking. The first one is partially done for you.
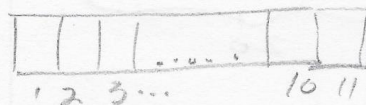
   a. 19 × 25 = __19__ twenty-fives

   Think: 20 twenty-fives − 1 twenty-five.

   = (__20__ × 25) − (__1__ × 25)

   = __500__ − __25__

   = __475__

   b. 24 × 11 = __11__ twenty-fours

   Think: __10__ twenty fours + __1__ twenty four

   = (__10__ × 24) + (__1__ × 24)

   = __240__ + __24__

   = __264__

EUREKA MATH™

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

17

c.   79 × 14 = _____79_____ fourteens

| 14 | 14 | 14 | ... | 14 | 14 |

80
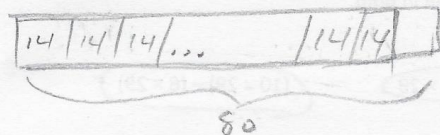
Think: ___80___ fourteens – 1 fourteen

= (___80___ × 14) – (___1___ × 14)

= __1120__ – __14__

= __1106__

d.   21 × 75 = _____21_____ seventy-fives

| 75 | 75 | 75 | ... | 75 | 75 |

20   1
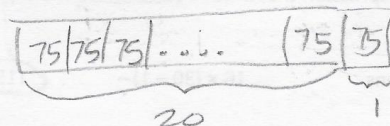
Think: ___20___ seventy-fives + ___1___ seventy-five

= (___20___ × 75) + (___1___ × 75)

= __1500__ + __75__

= __1575__

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

a.   19 × 15 = 19 ___fifteens___

| 15 | 15 | 15 | ... | ☒ |

20
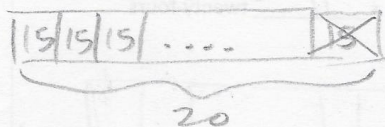
Think: 20 ___fifteens___ – 1 ___fifteen___

= (20 × ___15___) – (1 × ___15___)

= __300__ – __15__

= __285__

b.   14 × 15 = 14 ___fifteens___

| 15 | 15 | 15 | ... | 15 | 15 | 15 | 15 |

10   4
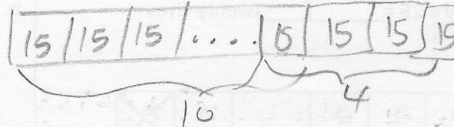
Think: 10 ___fifteens___ + 4 ___fifteens___

= (10 × ___15___) + (4 × ___15___)

= __150__ + __60__

= __210__

EUREKA MATH™

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

18

c. $25 \times 12 = 12$ __twenty-fives__

25 25 25 ... 25 25
        10   2
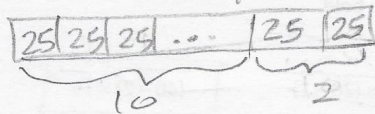
Think: 10 __twenty-fives__ + 2 __twenty-fives__

= (10 × __25__) + (2 × __25__)

= __250__ + __50__

= __300__

---

d. $18 \times 17 = 18$ __seventeens__

17 17 17 .... ~~17 17~~
        20
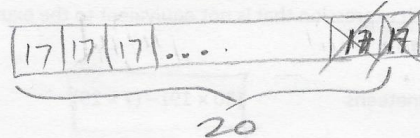
Think: 20 __seventeens__ − 2 __seventeens__

= (20 × __17__) − (2 × __17__)

= __340__ − __34__

= __306__

4.   How can 14×50 help you find 14×49?

14×49 is 14 less than 14×50. So, if 14×50 is 700, then 14×49 is 686.

5.   Solve mentally.

a. $101 \times 15 =$ __1515__
1500 + 15

b. $18 \times 99 =$ __1782__
1800 − 18

6.   Saleem says 45×32 is the same as $(45 \times 3) + (45 \times 2)$. Explain Saleem's error using words, numbers, and/or pictures.

45×32 ≠ (45×3) + (45×2). 45×32 would be (45×30) + (45×2), not 45×3 as Saleem says. The 3 is not ones, but tens.

7.   Juan delivers 174 newspapers every day. Edward delivers 126 more newspapers each day than Juan.

a.   Write an expression to show how many newspapers Edward will deliver in 29 days.

(174 + 126) × 29

b.   Use mental math to solve. Show your thinking.

(300 × 30) − (300 × 1)
9000 − 300 = 8700

EUREKA
MATH™

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

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 is partially done for you.

   a. 19 × 50 = _____ fifties

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

   Think: 20 fifties − 1 fifty

   = (__20__ × 50) − (__1__ × 50)

   = __1000__ − __50__

   = __950__

   b. 11 × 26 = __11__ twenty-sixes

   26/26/26/... 26/26
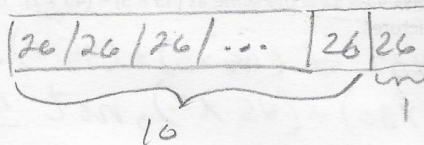
   Think: __10__ twenty-sixes + __1__ twenty-sixes

   = (__10__ × 26) + (__1__ × 26)

   = __260__ + __26__

   = __286__

EUREKA MATH

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

20

c. 49 × 12 = ____49____ twelves

| 12 | 12 | 12 | 12 | . . . . . | 12 | ☒ |

$\underbrace{\qquad\qquad\qquad}_{50}$
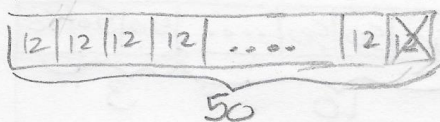
Think: __50__ twelves – 1 twelve

= (___50___ × 12) – (___1___ × 12)

= __600__ – __12__

= __588__

d. 12 × 25 = ____12____ twenty-fives

| 25 | 25 | 25 | . . . . | 25 | 25 |

$\underbrace{\qquad}_{10}$ $\underbrace{\qquad}_{2}$

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 the lesson.

a. 29 × 12 = 29 _twelves_

| 12 | 12 | 12 | 12 | . . . . | 12 | 12 | ☒ |

$\underbrace{\qquad\qquad\qquad}_{30}$
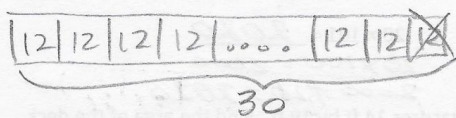
Think: 30 _twelves_ – 1 _twelve_

= (30 × __12__) – (1 × __12__)

= __360__ – __12__

= __348__

b. 11 × 31 = 31 _elevens_

| 11 | 11 | 11 | 11 | . . . . | 11 | 11 | 11 |

$\underbrace{\qquad\qquad\qquad}_{30}$
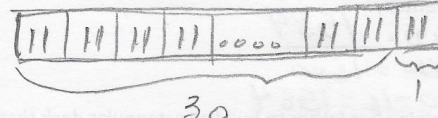
Think: 30 _elevens_ + 1 _elevens_

= (30 × __11__) + (1 × __11__)

= __330__ + __11__

= __319__

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

c.   19 × 11 = 19 _elevens_

20
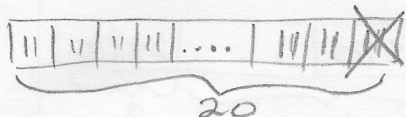
Think: 20 _elevens_ – 1 _eleven_

= (20 × __11__) – (1 × __11__)

= __220__ – __11__

= __209__

d.   50 × 13 = 13 _fifties_

10   3
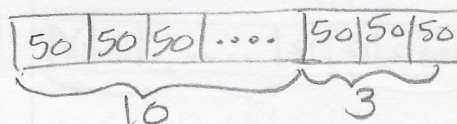
Think: 10 _fifties_ + 3 _fifties_

= (10 × __50__) + (3 × __50__)

= __500__ + __150__

= __650__

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

12 × 50 is 12 more than 12 × 49. So if 12 × 50 is 600, then 12 × 49 has to be __588__.

5.   Solve mentally.

a.   16 × 99 = __1584__

16 × 100 = 1600

1600 – 16 = 1584

b.   20 × 101 = __2020__

20 × 100 = 2000

2000 + 20 = 2020

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

14 × 19 =   = (14 × 20) – (14 × 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 × 101 = (23 × 100) – (23 × 1)

          = 2,300 – 23

            2,277

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

Name _____   Date _____

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

    a.   34 × 21 = _____
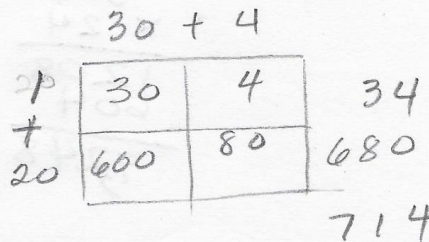
    b.   434 × 21 = _____

2. Solve using the standard algorithm.

    a.   431 × 12 = _____   b.   123 × 23 = _____   c.   312 × 32 = _____

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

23

3. Betty saves $161 a month. She saves $141 less each month than Jack. How much will Jack save in 2 years?

Betty's Savings
    $161 a month

| 302 | 302 | . . . | 302 | 302 | =?

24

Jack's savings
    $161 + $141
   = $302
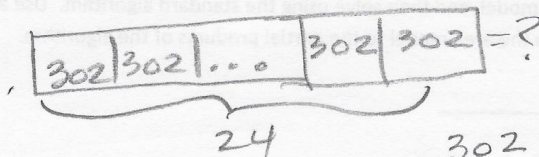
$$\begin{array}{r} 302 \\ \times\ 24 \\ \hline 1208 \\ 604 \\ \hline 7,248 \end{array}$$

Time 2 years
    = 24 months

Jack will save $7,248

4. Farmer Brown feeds 12.1 kilograms of alfalfa to each of his 2 horses daily. How many kilograms of alfalfa will all his horses have eaten after 21 days? Draw an area model to solve.

Alfalfa
12.1 Kg each
        horse

Horses
2

Days
21

$$\begin{array}{r} 12.1 \\ \times\ 2 \\ \hline 24.2 \end{array}$$

$$\begin{array}{r} 24.2 \\ \times\ 21 \\ \hline 24\,2 \\ 484 \\ \hline 5,082 \end{array}$$

Farmer Brown's horses ate 508.2 Kgs.
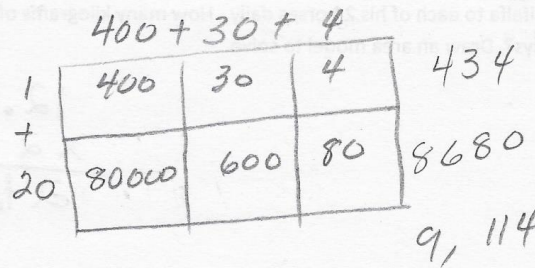
Name _____ Date _____

1. Draw an area model, and 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 = _____

	20 +	4
1	20	4
+ 20	400	80

   24
   480
   ___
   504

   ```
       24
     × 21
   _____
      2 4
    4 8
   _____
    5 0 4
   ```

   b.   242 × 21 = _____

	200 +	40 +	2
1	200	40	2
+ 20	4000	800	40

   242
   4840

   ```
        242
      × 21
   _____
      2 4 2
    4 8 4
   _____
    5,0 8 2
   ```

2. Solve using the standard algorithm.

   a.   314 × 22 = _____

   ```
       314
     × 22
   _____
      628
    628
   _____
    6,9 0 8
   ```

   b.   413 × 22 = _____

   ```
       413
     × 22
   _____
      826
    826
   _____
    9,0 8 6
   ```

   c.   213 × 32 = _____

   ```
       213
     × 32
   _____
      426
    639
   _____
    6,8 1 6
   ```

3. A young snake measures 0.23 meters long. During the course of his lifetime, he will grow to be 13 times his current length. What will his length be when he is full grown?

Young
snake's
length
0.23 m

Growth
13 times
as much

$$
\begin{array}{r}
0.23 \\
\times 13 \\
\hline
0.69 \\
23 \\
\hline
2.99
\end{array}
$$

The snake's length will be 2.99 m

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?

Zenin's
earns
$142 per shift

Number of
shifts
12

$$
\begin{array}{r}
142 \\
\times 12 \\
\hline
284 \\
142 \\
\hline
1,704
\end{array}
$$

Zenin's pay would be $1,704

EUREKA
MATH™

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

26

Name _____   Date _____

1. Draw an area model. 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. 48 × 35

40	+	8	
200		40	240
1 200		240	1440

5
+
30

$$\overset{2}{\underset{4}{}}$$
48
× 35
240
144
1680

b. 648 × 35

600 + 40 + 8

3000	200	40	3,240
18,000	1,200	240	19,440

5
+
30

$$\overset{1}{\underset{2}{}}\overset{2}{\underset{4}{}}$$
648
× 35
3240
1944
22,680

2. Solve using the standard algorithm.

a. 758 × 92

5,71
758
× 92
1516
6822
69,736

b. 958 × 94

5 7
2 3
958
× 94
13832
8622
90,052

EUREKA
MATH™

Lesson 6:   Connect area models and the distributive property to partial products of the standard algorithm with renaming.

c. 476 × 65

$$\begin{array}{r} {}^{4}{}^{3}_{3}476 \\ \times 65 \\ \hline {}_{1}2380 \\ 2856 \\ \hline 30,940 \end{array}$$

d. 547 × 64

$$\begin{array}{r} {}^{2}_{3}5{}^{4}{}_{7} \\ \times 64 \\ \hline 2188 \\ 3282 \\ \hline 35,008 \end{array}$$

3. Carpet costs $16 a square foot. A rectangular floor is 16 feet long by 14 feet wide. How much would it cost to carpet the floor?

Cost per square
square foot
$16

14 [rectangle 16]
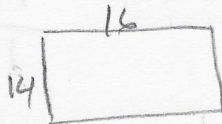
Area
16 × 14
= 224 ft²   It would cost $3,584

$$\begin{array}{r} {}^{1}{}^{2}224 \\ \times\ 16 \\ \hline 1344 \\ 224 \\ \hline 3,584 \end{array}$$

$$\begin{array}{r} {}^{2}{}_{6}16 \\ \times 14 \\ \hline 64 \\ 16 \\ \hline 224 \end{array}$$

4. General admission to The American Museum of Natural History is $19.

a. If a group of 125 students visits the museum, how much will the group's tickets cost?

Admission
$19

students
125

The tickets will cost $2,375

$$\begin{array}{r} {}^{2}{}^{4}125 \\ \times 19 \\ \hline 1125 \\ 125 \\ \hline 2,375 \end{array}$$

b. If the group also purchases IMAX movie tickets for an additional $4 per student, what is the new total cost of all the tickets? Write an expression that shows how you calculated the new price.

Additional
cost
$4 per student
students
125

$$\begin{array}{r} 2,375 \\ +\ 500 \\ \hline 2,875 \end{array}$$

$$\begin{array}{r} {}^{1}{}^{2}125 \\ \times\ 4 \\ \hline 500 \end{array}\ \text{or}$$

$(19+4) \times 125 = 2,875$

$$\begin{array}{r} {}^{1}125 \\ \times 23 \\ \hline 375 \\ 250 \\ \hline 2,875 \end{array}$$

Lesson 6:   Connect area models and the distributive property to partial products of the standard algorithm with renaming.

Name _____   Date _____

1. Draw an area model. 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

$$20 + 7$$

	20	7	
6	120	42	162
30	600	210	810

$$
\begin{array}{r}
27 \\
\times\ 36 \\
\hline
162 \\
81 \\
\hline
972
\end{array}
$$

b. 527 × 36

$$500 + 20 + 7$$

	500	20	7	
6	3000	120	42	3,162
30	15,000	600	210	15,810

$$
\begin{array}{r}
527 \\
\times\ 36 \\
\hline
3162 \\
1581 \\
\hline
18,972
\end{array}
$$

2. Solve using the standard algorithm.

a. 649 × 53

$$
\begin{array}{r}
649 \\
\times\ 53 \\
\hline
1947 \\
3245 \\
\hline
34,397
\end{array}
$$

b. 496 × 53

$$
\begin{array}{r}
496 \\
\times\ 53 \\
\hline
1488 \\
2480 \\
\hline
26,288
\end{array}
$$

c. 758 × 46

$$
\begin{array}{r}
758 \\
\times\ 46 \\
\hline
4548 \\
3032 \\
\hline
34,868
\end{array}
$$

d. 529 × 48

$$
\begin{array}{r}
529 \\
\times\ 48 \\
\hline
4232 \\
2116 \\
\hline
25392
\end{array}
$$

EUREKA
MATH

Lesson 6:   Connect area models and the distributive property to partial products
of the standard algorithm with renaming.

29

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

students
25
Tickets
16 each
Cost per
ticket
$15

$25 \times 16 \times 15 =$
$375 \times 16 =$
$6,000$

```
  2
 25        43
×15       375
 125      ×16
 25      2250
 375      375
         6000
```

Mr. McDonald's raise $6,000

4. Jayson buys a car and pays by installments. Each installment is $567 per month. After 48 months, Jayson owes $1,250. What was the total price of the vehicle?

Installment
$567

Still ows
$1,250

Payments
made
48

$(567 \times 48) + 1250$
$= 27,216 + 1,250$
$= 28,466$

```
  2 2
  5 5
  567
  ×48
 4536
 2268
27,216
```

```
 27,216
+ 1,250
 28,466
```

The total price was $28,466

Lesson 6:   Connect area models and the distributive property to partial products of the standard algorithm with renaming.

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.   481 × 352

$$400 + 80 + 1$$

	800	160	2	962
20000	4000	50	24,050
120,000	24000	300	144,300

2 + 50 + 300

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

   b.   481 × 302

$$400 + 80 + 1$$

	800	160	2	962
300	120,000	24,000	300	144,300

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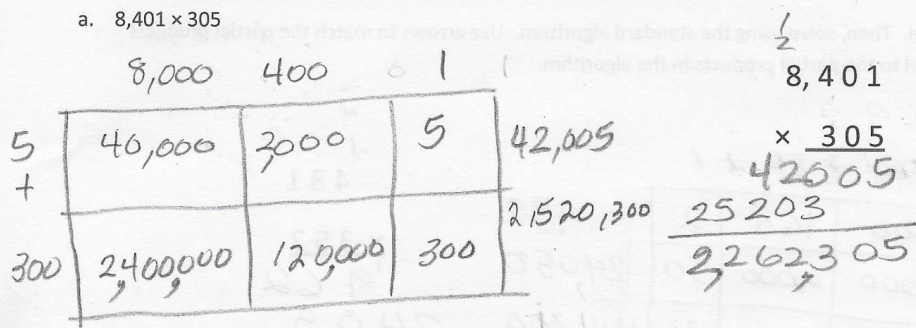+\,1\,4\,4\,3 \\
\hline
1\,4\,5,2\,6\,2
\end{array}
$$

   c.   Why are there three partial products in 1(a) and only two partial products in 1(b)?

In 1(b) the 0 in the tens place eliminates one partial product. Multiplying by zero gives products of zero, so there is no point in having a partial product of zero.

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

   a. 8,401 × 305
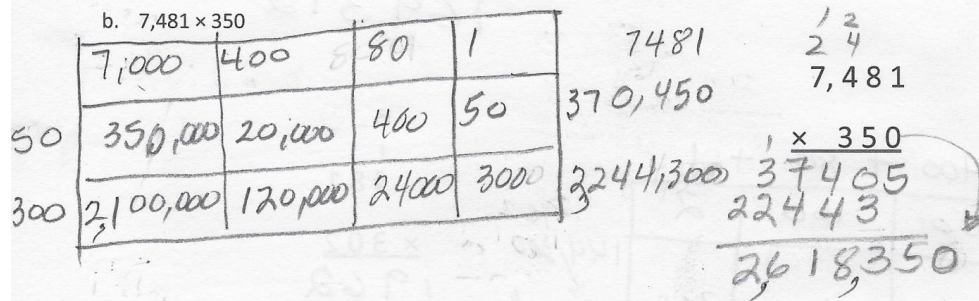
	8,000	400	1
5	40,000	2000	5
300	2,400,000	120,000	300

42,005
2,520,300

```
   8,401
×   305
  42005
 25203
2,262,305
```

   b. 7,481 × 350

	7,000	400	80	1
50	350,000	20,000	400	50
300	2,100,000	120,000	24000	300

7481
370,450
2,244,300

```
  7,481
×   350
 37405
22443
2,618,350
```

3. Solve using the standard algorithm.

   a. 346 × 27

```
   346
×   27
 2422
 692
 9,342
```

   b. 1,346 × 297

```
  1,346
×   297
  9432
 12114
 2692
 399,762
```

EUREKA
MATH™

Lesson 7:   Connect area models and the distributive property to partial products
of the standard algorithm with renaming.

32

c. 346 × 207

$$
\begin{array}{r}
3\;4 \\
346 \\
\times\,207 \\
\hline
124\,22 \\
692 \\
\hline
71\,622
\end{array}
$$

d. 1,346 × 207

$$
\begin{array}{r}
2\;3\;4 \\
1,346 \\
\times\,207 \\
\hline
,9422 \\
2692 \\
\hline
278,622
\end{array}
$$

4. A school district purchased 615 new laptops for their mobile labs. Each computer cost $409. What is the total cost for all of the laptops?

laptops
615
cost each
$409

$$
\begin{array}{r}
1\;4 \\
615 \\
\times\,409 \\
\hline
,5535 \\
2460 \\
\hline
251,535
\end{array}
$$

The total cost
is $251,535

5. A publisher prints 1,512 copies of a book in each print run. If they print 305 runs, how many books will be printed?

copies of book
1,512
runs
305

$$
\begin{array}{r}
3\;1 \\
1512 \\
\times\,305 \\
\hline
8060 \\
4536 \\
\hline
461,660
\end{array}
$$

There will be
461,660 books

6. As of the 2010 census, there were 3,669 people living in Marlboro, New York. Brooklyn, New York, has 681 times as many people. How many more people live in Brooklyn than in Marlboro?

people in Marlboro
3,669

people in Brooklyn

3,669 × 681 = 2,498,589

There are 2,494,920 more people in Brooklyn

$$
\begin{array}{r}
2,498,589 \\
-\quad 3,669 \\
\hline
2,494,920
\end{array}
$$

$$
\begin{array}{r}
4\;4\;5 \\
5\;5\;7 \\
3,669 \\
681 \\
\hline
3669 \\
29352 \\
22014 \\
\hline
2,498,589
\end{array}
$$

Name _____   Date _____

1. Draw an area model. 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

	200	70	3
6	1200	420	18
40	8,000	2800	120
300	160,000	21,000	900

1,638
10,920
81,900

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

   b. 273 × 306

	200	70	3
6	1200	420	18
300	60,000	21,000	900

1,638
81,900

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

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

   The part (b) is 306. The tens place is zero. So, it only has two partial products.

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

a. 7,481 × 290

7,000	400	80	1
630,000	36,000	7,200	90	= 673,290
1,400,000	80,000	16,000	200	= 1,496,200

(left labels: '90, 200)

$$\begin{array}{r} \overset{4}{7},\overset{7}{4}81 \\ \underline{290} \\ 67329 \\ 14962 \\ \hline 189,949 \end{array}$$

b. 7,018 × 209

7,000	10	8
63,000	90	72	= 63,162
1,400,000	2,000	1,600	= 1,403,600

(left labels: 9, 200)

$$\begin{array}{r} \overset{1}{7},018 \\ \times209 \\ \hline 63162 \\ 14036 \\ \hline 1\,466\,762 \end{array}$$

3. Solve using the standard algorithm.

a. 426 × 357

$$\begin{array}{r} \overset{1}{4}\overset{4}{2}\overset{3}{6} \\ \times\,357 \\ \hline \overset{2}{2}982 \\ \overset{1}{2}130 \\ 1278 \\ \hline 152,082 \end{array}$$

b. 1,426 × 357

$$\begin{array}{r} \overset{2}{1},\overset{1}{4}\overset{3}{2}\overset{4}{6} \\ \times357 \\ \hline \overset{2}{}9982 \\ 7130 \\ 4278 \\ \hline 509,082 \end{array}$$

EUREKA MATH

Lesson 7:   Connect area models and the distributive property to partial products
            of the standard algorithm with renaming.

35

c. 426 × 307

$$\begin{array}{r} \overset{1}{4}\overset{4}{2}6 \\ \times\ 307 \\ \hline ,2982 \\ 1278\ \ \\ \hline 130,782 \end{array}$$

d. 1,426 × 307

$$\begin{array}{r} 1,\overset{2}{4}\overset{1}{2}\overset{4}{6} \\ \times\ 307 \\ \hline ,9982 \\ 4278\ \ \\ \hline 437,782 \end{array}$$

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

Seats
4,505

Games
219

$$\begin{array}{r} \overset{4}{4},\overset{4}{5}05 \\ \times\ 219 \\ \hline 40545 \\ 4505\ \ \\ 9010\ \ \ \\ \hline 986,595 \end{array}$$
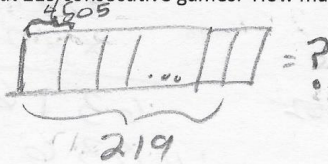
They sold 986,595 tickets

5. One Saturday at the farmer's market, each of the 94 vendors made $502 in profit. How much profit did all vendors make that Saturday?

Vendors
94

Profit
$502 each

$$\begin{array}{r} 562 \\ \times\ 94 \\ \hline 2008 \\ 4518\ \ \\ \hline 47,188 \end{array}$$

All vendors made $47,188 in profits

Lesson 7: Connect area models and the distributive property to partial products of the standard algorithm with renaming.

Name _____ Date _____

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

a. 213 × 328	b. 662 × 372	c. 739 × 442
≈ 200 × 300 = 60,000 328 213 $\begin{array}{r} 213 \\ \times\ 328 \\ \hline 1984 \\ 328 \\ 656 \\ \hline 69,864 \end{array}$	= 700 × 400 = 280,000 $\begin{array}{r} 372 \\ \times 662 \\ \hline 744 \\ 2232 \\ 2232 \\ \hline 256264 \end{array}$	700 × 400 = = 280,000 $\begin{array}{r} 739 \\ \times 442 \\ \hline 1478 \\ 2956 \\ 2956 \\ \hline 326638 \end{array}$
d. 807 × 491	e. 3,502 × 656	f. 4,390 × 741
= 860 × 500 = 400,000 $\begin{array}{r} 491 \\ \times 807 \\ \hline 3437 \\ 3928 \\ \hline 396,237 \end{array}$	= 4,000 × 700 = 2,800,000 $\begin{array}{r} 3,502 \\ \times\ 656 \\ \hline 21012 \\ 17510 \\ 21012 \\ \hline 2297312 \end{array}$	= 4,000 × 700 = 2,800,000 $\begin{array}{r} 4,390 \\ \times 741 \\ \hline 14390 \\ 17560 \\ 30730 \\ \hline 3252990 \end{array}$
g. 530 × 2,075	h. 4,004 × 603	i. 987 × 3,105
= 500 × 2000 = 1,000,000 $\begin{array}{r} 2,075 \\ 530 \\ \hline 825 \\ 10375 \\ \hline 1,045,250 \end{array}$	= 4,000 = 600 = 2,400,000 $\begin{array}{r} 4,004 \\ \times 603 \\ \hline 12012 \\ 24024 \\ \hline 2,414,412 \end{array}$	1,000 × 3,000 3,000,000 $\begin{array}{r} 3,105 \\ \times 987 \\ \hline 21735 \\ 24840 \\ 27945 \\ \hline 3064635 \end{array}$

EUREKA MATH™

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

37

2. Each container holds 1 L 275 mL of water. How much water is in 609 identical containers? Find the difference between your estimated product and precise product.

Container holds
1.275 L

containers
609

1.275 ≈ 1.3

609   ≈ 600

```
  1.3
 ×600
≈780.0
```

```
 780.000
-776.475
 003.525
```

```
  1.275
  ×609
 11475
  7650
776.475
```

3. A club had some money to purchase new chairs. After buying 355 chairs at $199 each, there was $1,068 remaining. How much money did the club have at first?

chairs
355

Price
$199

remaining
$1,068

? =

$1,068

199

```
  199
 ×355
  995
  995
  498
60745
```

```
 60,745
+ 1,068
 61,813
```
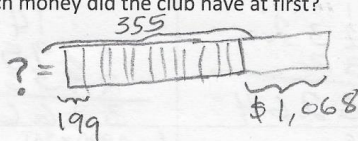
The club had $ 61,813

4. So far, Carmella has collected 14 boxes of baseball cards. There are 315 cards in each box. Carmella estimates that she has about 3,000 cards, so she buys 6 albums that hold 500 cards each.

a. Will the albums have enough space for all of her cards? Why or why not?

boxes
14

cards/box
315

14 × 315
≈ 10 × 300
≈ 3,000

```
  315
  ×14
 1260
  315
 4,410
```

No! she
needs 3
more albums

b. How many cards does Carmella have?

She has 4,410 cards

c. How many albums will she need for all of her baseball cards?

She will need 9 albums

EUREKA
MATH

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

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 = 30,000 312 × 149 2808 1248 312 46,488	≈ 700 × 300 ≈ 210,000 743 ×295 3715 6587 1486 218,185	≈ 400 × 600 ≈ 240,000 637 ×428 5096 1274 2548 272,636
d. 691 × 305	e. 4,208 × 606	f. 3,068 × 523
≈ 700 × 300 ≈ 210,000 691 ×305 3455 2073 210,755	≈ 4000 × 600 ≈ 2,400,000 4,208 ×606 25248 25248 2,550,048	≈ 3,000 × 500 ≈ 1,500,000 3,068 × 523 9204 6136 15340 1,604,564
g. 430 × 3,064	h. 3,007 × 502	i. 254 × 6,104
≈ 400 × 3,000 ≈ 1,200,000 3,064 × 430 9192 12256 1,317,520	≈ 3,000 × 500 ≈ 1,500,000 3,007 × 502 6014 15035 1,509,514	300 × 6,000 1,800,000 6,104 × 254 24416 30520 12208 1,550,416

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

$1,729 \approx 2,000$ $2,000 \times 300$

$308 \approx \quad 300$ $\approx 600,000$

The product must have 6 digits.
So, Clayton's product is not reasonable because it has only 5 digits

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 is a reasonable estimate?

copies
1,912

runs
305

$1,912 \approx 2,000$ $2,000 \times 300$

$305 \approx \quad 300$ $\approx 600,000$

Also:

$1,912 \approx 1,900$ 1900×300

$305 \approx \quad 300$ $\approx 570,000$

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

40

Name _____   Date _____

Solve.

1. An office space in New York City measures 48 feet by 56 feet. If it sells for $565 per square foot, what is the total cost of the office space?

56 ft

48 ft
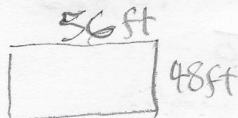
$565 per square foot

$$
\begin{array}{r}
56 \\
\times 48 \\
\hline
448 \\
224 \\
\hline
2,688
\end{array}
$$

$$
\begin{array}{r}
2,688 \\
\times 565 \\
\hline
13440 \\
16128 \\
13440 \\
\hline
1,518,720
\end{array}
$$

The total cost is $1,518,720.

2. Gemma and Leah are both jewelry makers. Gemma made 106 beaded necklaces. Leah made 39 more necklaces than Gemma.

a. Each necklace they make has exactly 104 beads on it. How many beads did both girls use altogether while making their necklaces?

Gema   106 necklaces

Leah   145 necklaces
     (106+39)

$$
\begin{array}{r}
106 \\
+145 \\
\hline
251
\end{array}
$$

$$
\begin{array}{r}
251 \\
\times 104 \\
\hline
1004 \\
251 \\
\hline
26,104
\end{array}
$$

| 106 | 145 | ? |

| 251 | 251 | ... | 251 | 251 |
       104

The girls use   26,104 beads

b. At a recent craft fair, Gemma sold each of her necklaces for $14. Leah sold each of her necklaces for 10 dollars more. Who made more money at the craft fair? How much more?

Gema

| 14 | 14 | 14 | ... | 14 | 14 | = ?
         106

Leah
| 24 | 24 | 24 | ... | 24 | 24 | = ?
      145

$$
\begin{array}{r}
3,480 \\
-1,484 \\
\hline
1,996
\end{array}
$$

$$
\begin{array}{r}
106 \\
\times 14 \\
\hline
424 \\
106 \\
\hline
1,484
\end{array}
$$

$$
\begin{array}{r}
145 \\
\times 24 \\
\hline
580 \\
290 \\
\hline
3,480
\end{array}
$$

Leah made more, $1,996 more.

3. Peng bought 26 treadmills for her new fitness center at $1,334 each. Then, she bought 19 stationary bikes for $749 each. How much did she spend on her new equipment? Write an expression, and then solve.

treadmills
26 at $1,334 each

bikes
19 at $749 each

$$(26 \times 1,334) + (19 \times 749)$$

$$
\begin{array}{r}
34,684 \\
+ 14,231 \\
\hline
48,915
\end{array}
$$

$$
\begin{array}{r}
1,334 \\
\times 26 \\
\hline
8004 \\
2668 \\
\hline
34,684
\end{array}
$$

$$
\begin{array}{r}
749 \\
\times 19 \\
\hline
6741 \\
749 \\
\hline
14,231
\end{array}
$$

Peng spent $48,915

EUREKA MATH™

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

41

4. A Hudson Valley farmer has 26 employees. He pays each employee $410 per week. After paying his workers for one week, the farmer has $162 left in his bank account. How much money did he have at first?

employees
26

salary week
$410

left in account
$162

| 410 | 410 | 410 | ... | 410 |

26

| 10,660 | 162 | =?

$$410 \times 26$$
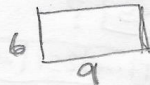$$\begin{array}{r} 410 \\ \times 26 \\ \hline 2460 \\ 820 \\ \hline 10,660 \end{array}$$

$$\begin{array}{r} 10,660 \\ + 162 \\ \hline 10,822 \end{array}$$

The farmer had $10,822.

5. Frances is sewing a border around 2 rectangular tablecloths that each measure 9 feet long by 6 feet wide. If it takes her 3 minutes to sew on 1 inch of border, how many minutes will it take her to complete her sewing project? Write an expression, and then solve.

$$2 \times (6+9) \times 2 = (2 \times 15) \times 2 = 30 \times 2 = 60$$

$$60 \times 3 = 180$$

Frances takes 180 minutes

6. Each grade level at Hooperville Schools has 298 students.

   a. If there are 13 grade levels, how many students attend Hooperville Schools?

students
298

grades
13

| 298 | 298 | 298 | ... | 298 |

13

$$\begin{array}{r} 298 \\ \times 13 \\ \hline 894 \\ 298 \\ \hline 3,874 \end{array}$$

3,874 students attend HS.

   b. A nearby district, Willington, is much larger. They have 12 times as many students. How many students attend schools in Willington?

| 3,874 | 3,874 | ... | 3,874 |

12

$$\begin{array}{r} 3,874 \\ \times 12 \\ \hline 7748 \\ 3874 \\ \hline 46,488 \end{array}$$

46,488 students attend schools in Willington

EUREKA MATH

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

42

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?

sheets
203

stickers
12

gave away
907

| 203 | 203 | ... | 203 | 203 |

12

$$\begin{array}{r} 203 \\ \times 12 \\ \hline 406 \\ 203 \\ \hline 2,436 \end{array}$$

$$\begin{array}{r} 2,436 \\ -907 \\ \hline 1,529 \end{array}$$

Jeffery has 1,529 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. For how many total yards did the quarterback pass?

yards per game
302

games
16

| 302 | 302 | ... | 302 | 302 |

16

$$\begin{array}{r} 302 \\ \times 16 \\ \hline 1812 \\ 302 \\ \hline 4,832 \end{array}$$

The quarterback passed for 4,832

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

season
4,832 yards

carrer
14 seasons
(13+1)

| 4,832 | 4,832 | 4,832 | ... | 4,832 |

14

$$\begin{array}{r} 4,832 \\ \times 14 \\ \hline 19328 \\ 4832 \\ \hline 67,648 \end{array}$$

He will pass for 67,648 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?

Bao gave
$179 a month

Ada save
$324

Ada | 324 | 324 | ... | 324 | 324 |

42 months

$$\begin{array}{r} 12 \\ 12 \\ 12 \\ 6 \\ \hline 42 \end{array}$$

$$\begin{array}{r} 324 \\ \times 42 \\ \hline 648 \\ 1296 \\ \hline 13,608 \end{array}$$

Ada will save $13,608

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.
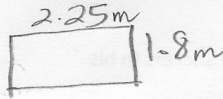
$$\begin{array}{r} 3.\overset{4}{2}5 \\ \times 1.8 \\ \hline 1800 \\ 225 \\ \hline 4.050 \end{array}$$

$4.050\,m = 405\,cm$

The area is 405 cm

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.

$$(120 \times 80) - (100 \times 55)$$
$$9600 - 5500 =$$
$$4100$$

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?

$$7,500 \div 75 = 100$$

This field is not within FIFA regulations. The lenght of the field is short by 10 yards.

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?

$$120 \times 80 = $$
$$9600\ ft^2$$

$$\begin{array}{r} \overset{3}{9},\overset{1}{6}00 \\ \times \quad 26 \\ \hline 57600 \\ 19200 \\ \hline 249,600 \end{array}$$
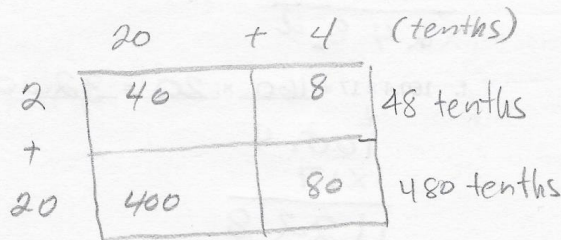
It will cost $249,600.

Name _____   Date _____

1. Estimate the product. Solve using an area model and the standard algorithm. Remember to express your products in standard form.
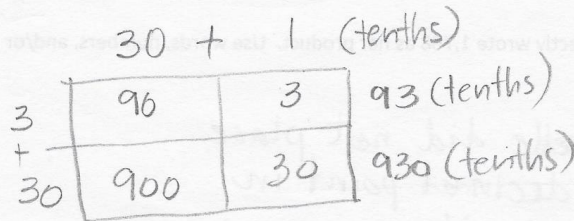
a. $22 \times 2.4 \approx$ __20__ $\times$ __2__ = __40__

     20° 2.0

      20   +   4   (tenths)

2 | 40 | 8 | 48 tenths

20 | 400 | 80 | 480 tenths

   24
  ×22
   48
   48
  52.8

24 (tenths)
×22
  48
  48
528 (tenths)
= 52.8

2 4
(tenths) × 2 2

b. 3.1×33 __3__ $\times$ __30__ = __90__

      30 + 1   (tenths)

3 | 96 | 3 | 93 (tenths)

30 | 900 | 30 | 930 (tenths)

3 1
(tenths) × 3 3

  3.1
  ×33
 ,93
  93
102.3

31 (tenths)
33
,93
93
1023 (tenths)
= 102.3

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

a. $3.2 \times 47 \approx$ __3__ $\times$ __50__ = __150__

32 (tenths)
× 47
,22 4
128
1,504 (tenths
= 150.4

3 2
(tenths) × 4 7

b. $3.2 \times 94 \approx$ __3__ $\times$ __90__ = __270__

32 (tenths)
×94
,128
288
3008 (tenths)
= 300.8

3 2
(tenths) × 9 4

c. $6.3 \times 44 \approx$ __6__ $\times$ __40__ = __240__

$$\begin{array}{r} {}^1 \\ 6.3 \\ \times\ 44 \\ \hline 252 \\ 252 \\ \hline 277.2 \end{array}$$

d. $14.6 \times 17 \approx$ __15__ $\times$ __20__ = __300__

$$\begin{array}{r} {}^{3\ 4} \\ 14.6 \\ \times\ 17 \\ \hline 1022 \\ +\ 146 \\ \hline 248.2 \end{array}$$

e. $8.2 \times 34 \approx$ __8__ $\times$ __30__ = __240__

$$\begin{array}{r} 8.2 \\ \times\ 34 \\ \hline 328 \\ 246 \\ \hline 278.8 \end{array}$$

f. $160.4 \times 17 \approx$ __160__ $\times$ __20__ = __3,200__

$$\begin{array}{r} {}^1 \\ 160.4 \\ \times\ 17 \\ \hline 11228 \\ +\ 1604 \\ \hline 2726.8 \end{array}$$

3. Michelle multiplied 3.4×52. She incorrectly wrote 1,768 as her product. Use words, numbers, and/or pictures to explain Michelle's mistake.

$$\begin{array}{r} {}^2 \\ 3.4 \\ \times\ 52 \\ \hline 68 \\ 170 \\ \hline 176.8 \end{array}$$

Michelle did not place the decimal point in the tenths.

$1768. \neq 176.8$

4. A wire is bent to form a square with a perimeter of 16.4 cm. How much wire would be needed to form 25 such squares? Express your answer in meters.

Perimeter
16.4 cm

Squares
25

| 16.4 | 16.4 | 16.4 | ○○○ | 16.4 | = ? |

25

$\boxed{1m = 100cm}$

$$\begin{array}{r} {}^{3\ 2} \\ 16.4\ cm \\ \times\ 25 \\ \hline 820 \\ 328 \\ \hline 410.0\ cm \\ = 4.10\ m \end{array}$$

4.10 meters of wire would be needed

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MATH™

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

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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 × 1.2 ≈ __50__ × __1__ = __50__

   $$\begin{array}{c|cc|c} & 50 & + & 3 & \\ \hline 0.2 & 10 & + & 0.6 & 10.6 \\ \hline 1 & 50 & + & 3 & 53 \end{array}$$

   12
   (tenths) × 5 3

   $$\begin{array}{r} 53 \\ \times\ 162 \\ \hline 106 \\ 53 \\ \hline 63.6 \end{array}$$

   12 (tenths)
   $$\begin{array}{r} \times 53 \\ \hline 36 \\ 60 \\ \hline 636 \text{ (tenths)} \\ = 63.6 \end{array}$$

   b. 2.1 × 82 ≈ __2__ × __80__ = __160__

   $$\begin{array}{c|cc|c} & 80 & + & 2 & \\ \hline 0.1 & 8 & + & 0.2 & 8.2 \\ \hline 2 & 160 & + & 4 & 164 \end{array}$$

   21
   (tenths) × 8 2

   $$\begin{array}{r} 82 \\ \times 2.1 \\ \hline 82 \\ 164 \\ \hline 172.2 \end{array}$$

   82
   $$\begin{array}{r} \times\ 21 \text{ (tenths)} \\ \hline 82 \\ 164 \\ \hline 1722 \text{ (tenths)} \\ = 172.2 \end{array}$$

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

   a. 4.2 × 34 ≈ __4__ × __30__ = __120__

   $$\begin{array}{r} 4.2 \\ \times 34 \\ \hline 168 \\ 126 \\ \hline 142.8 \end{array}$$

   42
   (tenths) × 3 4

   b. 65 × 5.8 ≈ __70__ × __9__ = __630__

   $$\begin{array}{r} 5.8 \\ \times 65 \\ \hline 290 \\ +348 \\ \hline 377.0 \end{array}$$

   58
   (tenths) × 6 5

EUREKA MATH

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

47

c. $3.3 \times 16 \approx$ __3__ × __20__ = __60__

$$
\begin{array}{r}
16\,3 \\
\times\,3.3 \\
\hline
,4\,8 \\
4\,8 \\
\hline
5\,2.8
\end{array}
$$

d. $15.6 \times 17 \approx$ __16__ × __20__ = __320__

$$
\begin{array}{r}
3\,\overset{4}{5}.6 \\
\times\,17 \\
\hline
10\,9\,2 \\
15\,6 \\
\hline
265.2
\end{array}
$$

e. 73×2.4 __70__ × __2__ = __140__

$$
\begin{array}{r}
\overset{1}{7}3 \\
\times\,2.4 \\
\hline
2\,9\,2 \\
14\,6 \\
\hline
17\,5.2
\end{array}
$$

f. $193.5 \times 57 \approx$ __194__ × __60__ = __11640__

$$
\begin{array}{r}
1\overset{2}{9}\overset{1}{3}.\overset{3}{5}\overset{2}{} \\
\times\,57 \\
\hline
1\,3\,5\,4\,5 \\
+\;9\,6\,7\,5 \\
\hline
11029.5
\end{array}
$$

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?

22m

8.4m
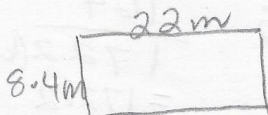
$A = L \times w$
$A = 22 \times 8.4$

$$
\begin{array}{r}
8.4 \\
\times\,22 \\
\hline
16\,8 \\
16\,8 \\
\hline
184.8
\end{array}
$$

The area is $184.8\,m^2$

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

each of the
weekdays
3.2 miles
weekend day
1.5

$$
\begin{array}{r}
3.2 \\
\times\,5 \\
\hline
16.0
\end{array}
$$

$$
\begin{array}{r}
16 \\
+\,3 \\
\hline
19
\end{array}
$$
(a week)

$$
\begin{array}{r}
\overset{5}{1}9 \\
\times\,6 \\
\hline
114
\end{array}
$$

$$
\begin{array}{r}
1.5 \\
\times\,2 \\
\hline
3.0
\end{array}
$$

Rachel will have run 114 miles in 6 weeks

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

EUREKA
MATH   48

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. $1.38 \times 32 \approx$ __1__ $\times$ __30__ = __30__

   Think!
   $1.38 \times 100 \div 138$

   $1.\overset{2}{3}8$
   $\underline{\times\ 3\ 2}$
   $2\ 7\ 6$
   $4\ 1\ 4$
   $\underline{}$
   $4\ 4.1\ 6$

   $1.38 \times 32 =$ __44.16__

   Think! 4,416 is 100 times too large! What is the real product?

   $4,416 \div 100 \div 44.16$

   b. $3.55 \times 89 \approx$ __4__ $\times$ __90__ = __360__

   3.55 has hundredths! The product must have hundredths as well

   $\overset{4\ 4}{\underset{4\ 4}{3.5\ 5}}$
   $\underline{\times\ 8\ 9}$
   $3\ 1\ 9\ 5$
   $2\ 8\ 4\ 6$
   $\underline{}$
   $3\ 2\ 5.9\ 5$

   $3.55 \times 89 =$ __325.95__

   Be careful not to write 32595!

2. Solve using the standard algorithm.

   a. 5.04×8

   $5.\overset{3}{0}4$
   $\underline{\times\ 8}$
   $4\ 0.3\ 2$

   b. 147.83×67

   $1\overset{2}{4}\overset{4}{7}.\overset{5}{8}\overset{2}{3}$
   $\underline{\times\ 6\ 7}$
   $1\ 0\ 3\ 4\ 8\ 1$
   $+\ 8\ 8\ 6\ 9\ 8$
   $\underline{}$
   $9,9\ 0\ 4.6\ 1$

c. 83.41 × 504

$$1\ 1^2$$
$$83.41$$
$$\times 504$$
$$25364$$
$$+\ 41705$$
$$41,958.64$$

d. 0.56 × 432

$$11$$
$$11$$
$$.432$$
$$\times 0.56$$
$$2592$$
$$+\ 2160$$
$$241.92$$

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 98 × 768 = 75,264   then   98 × 7.68 = 752.68

b. If 73 × 1,563 = 114,099   then   73 × 15.63 = 1,140.99

c. If 46 × 1,239 = 56,994   then   46 × 123.9 = 5,699.4

4. Jenny buys 22 pens that cost $1.15 each and 15 markers that cost $2.05 each. How much did Jenny spend?

Pens   Cost
22    $1.15 each
Markers cost
15    $2.05 each
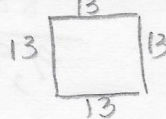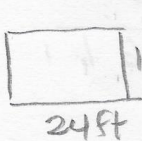
$$1.15$$
$$22$$
$$230$$
$$230$$
$$25.30$$

$$2.05$$
$$\times 15$$
$$1025$$
$$205$$
$$30.75$$

$$30.75$$
$$+25.30$$
$$56.05$$

Jenny spends
$56.05

5. A living room measures 24 feet by 15 feet. An adjacent square dining room measures 13 feet on each side. If carpet costs $6.98 per square foot, what is the total cost of putting carpet in both rooms?

15 ft   13   13   13
24 ft

$$2$$
$$24$$
$$\times 15$$
$$120$$
$$24$$
$$360$$

$$13$$
$$\times 13$$
$$39$$
$$13$$
$$169$$

$$360$$
$$+169$$
$$529$$

$$4\ 1\ 4$$
$$8\ 7$$
$$6.98$$
$$\times 529$$
$$6282$$
$$1396$$
$$3490$$
$$3692.42$$

The total cost is $3,692.42

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__ $\times$ __10__ = __20__

   Think!
   $2.42 \times 100 \div 242$

   $2.42 \times 12 = $ __29.04__

   ```
       2.4 2
     ×   1 2
       4 8 4
     2 4 2
     2 9.0 4
   ```

   Think! 2,904 is 100 times too large! What is the real product?

   $2,904 \div 100 \div 29.04$

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

   4.13 has hundredths, The product must also have hundredths

   $4.13 \times 37 = $ __152.81__

   ```
       4.1 3
     ×   3 7
     2 8 9 1
     1 2 3 9
     1 5 2.8 1
   ```

   Be careful placing the decimal point

2. Solve using the standard algorithm.

   a. 2.03×13

   ```
       2.0 3
     × 1 3
       6 0 9
     2 0 3
     2 6.3 9
   ```

   b. 53.16×34

   ```
        5 3.1 6
      ×    3 4
      2 1 2 6 4
    1 5 9 4 8
    1 8 0 7.4 4
   ```

c. 371.23 × 53
$$\begin{array}{r} 371.23 \\ \times\ 53 \\ \hline 111369 \\ 185615\ \ \ \\ \hline 19675.19 \end{array}$$

d. 1.57 × 432
$$\begin{array}{r} 1.57 \\ \times\ 432 \\ \hline 314 \\ 471\ \ \\ 628\ \ \ \\ \hline 678.24 \end{array}$$

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 = __2,246.16__

c. 19 × 3,211 = 61,009   then   321.1 × 19 = __6,100.9__

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

$$\begin{array}{r} 1.57 \\ \times\ 27 \\ \hline 1099 \\ 314\ \ \\ \hline 42.39 \end{array}$$

27 slices will cost $42.39

5. A spool of ribbon holds 6.75 meters. A craft club buys 21 spools.
   a. What is the total cost if the ribbon sells for $2 per meter?

1 spool – 6.75 m
21 spools – ? m
price $2 per meter

The total cost
is $283.50

$$\begin{array}{r} 6.75 \\ 21 \\ \hline 675 \\ 1350\ \ \\ \hline 141.75\,m \end{array}$$

$$\begin{array}{r} 141.75 \\ \times\ \$2 \\ \hline 283.50 \end{array}$$

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

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

There will be 65.21 m left

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.

Name _____   Date _____

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

     a. $1.21 \times 14 \approx$ ___1___ $\times$ ___14___ = ___14___

$$
\begin{array}{r}
1.21 \\
\times \ \ 14 \\
\hline
484 \\
121 \ \ \\
\hline
16.94
\end{array}
$$

     b. $2.45 \times 305 \approx$ ___2___ $\times$ ___300___ = ___600___

$$
\begin{array}{r}
\overset{2}{\ }\overset{1}{\ } \\
2.45 \\
\times \ 305 \\
\hline
1225 \\
735 \ \ \\
\hline
747.25
\end{array}
$$

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

     a. $1.23 \times 12 \approx$ ___1___ $\times$ ___12___ = ___12___

$$
\begin{array}{r}
1.23 \\
\times 12 \\
\hline
246 \\
123 \ \\
\hline
14.76
\end{array}
$$

     b. $1.3 \times 26 \approx$ ___1___ $\times$ ___30___ = ___30___

$$
\begin{array}{r}
\overset{1}{2}6 \\
\times \ 1.3 \\
\hline
78 \\
26 \ \\
\hline
33.8
\end{array}
$$

     c. $0.23 \times 14 \approx$ ___0.2___ $\times$ ___10___ = ___2___

$$
\begin{array}{r}
\overset{1}{0.23} \\
\times 14 \\
\hline
192 \\
23 \ \\
\hline
3.22
\end{array}
$$

     d. $0.45 \times 26 \approx$ ___0.5___ $\times$ ___30___ = ___15.0___

$$
\begin{array}{r}
\overset{2}{\ }\overset{3}{\ } \\
0.45 \\
\times 26 \\
\hline
270 \\
90 \ \\
\hline
11.70
\end{array}
$$

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

53

e.   7.06 × 28 ≈ ___7___ × ___30___ = ___210___

$$\begin{array}{r} 7.06 \\ 28 \\ \hline 5648 \\ 1412 \\ \hline 197.68 \end{array}$$

f.   6.32 × 223 ≈ ___6___ × ___200___ = ___1200___

$$\begin{array}{r} 6.32 \\ 223 \\ \hline 1896 \\ 1264 \\ 1264 \\ \hline 1409.36 \end{array}$$

g.   7.06 × 208 ≈ ___7___ × ___200___ = ___1400___

$$\begin{array}{r} 7.06 \\ \times 208 \\ \hline 5648 \\ 1412 \\ \hline 1468.48 \end{array}$$

h.   151.46 × 555 ≈ ___150___ × ___600___ = ___90000___

$$\begin{array}{r} 151.46 \\ \times 555 \\ \hline 75730 \\ 75730 \\ 75730 \\ \hline 84060.30 \end{array}$$

3.   Denise walks on the beach every afternoon. In the month of July, she walked 3.45 miles each day. How far did Denise walk during the month of July?

3.45 × 31

$$\begin{array}{r} 3.41 \\ 31 \\ \hline 341 \\ 1023 \\ \hline 105.71 \end{array}$$

Denise walks
105.71 miles in July

4.   A gallon of gas costs $4.34. Greg puts 12 gallons of gas in his car. He has a 50-dollar bill. Tell how much money Greg will have left, or how much more money he will need. Show all your calculations.

12 × $4.34

$$\begin{array}{r} 4.34 \\ \times 12 \\ \hline 868 \\ 434 \\ \hline 52.08 \end{array}$$

$$\begin{array}{r} 52.08 \\ 50.00 \\ \hline 2.08 \end{array}$$

Greg needs $2.08 more.

5.   Seth drinks a glass of <u>orange juice every day</u> that contains <u>0.6 grams of Vitamin C</u>. He eats a serving of strawberries for snack <u>after school every day that contains 0.35 grams of Vitamin C</u>. How many grams of Vitamin C does Seth consume in 3 weeks?

0.6g × 21 (days)
0.35g × 15 (days)

$$\begin{array}{r} 21 \\ \times 0.6 \\ \hline 12.6 \end{array}$$

$$\begin{array}{r} 0.35 \\ \times 15 \\ \hline 175 \\ 35 \\ \hline 5.25 \end{array}$$

$$\begin{array}{r} 12.6 \\ 5.25 \\ \hline 17.75 \end{array}$$

Seth consumes 17.75 grams

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

Name _____   Date _____

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

a. 24 × 2.31 ≈ ___20___ × ___2___ = ___40___

$$\begin{array}{r} 2.31 \\ \times\ 24 \\ \hline 924 \\ 462 \\ \hline 55.44 \end{array}$$

b. 5.42 × 305 ≈ ___5___ × ___300___ = ___1500___

$$\begin{array}{r} 5.42 \\ \times\ 305 \\ \hline 2610 \\ 1626 \\ \hline 1652.10 \end{array}$$

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

a. 1.23 × 21 ≈ ___1___ × ___20___ = ___20___

$$\begin{array}{r} 1.23 \\ 21 \\ \hline 123 \\ 246 \\ \hline 25.83 \end{array}$$

b. 3.2 × 41 ≈ ___3___ × ___40___ = ___120___

$$\begin{array}{r} 3.2 \\ 41 \\ \hline 32 \\ 128 \\ \hline 131.2 \end{array}$$

c. 0.32 × 41 ≈ ___0.3___ × ___40___ = ___1.2___

$$\begin{array}{r} 0.32 \\ \times 41 \\ \hline 32 \\ 128 \\ \hline 13.12 \end{array}$$

d. 0.54 × 62 ≈ ___.5___ × ___60___ = ___3___

$$\begin{array}{r} 0.54 \\ 62 \\ \hline 1 68 \\ 324 \\ \hline 33.48 \end{array}$$

EUREKA MATH™

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

e. $6.09 \times 28 \approx$ __6__ $\times$ __30__ $=$ __180__   f. $6.83 \times 683 \approx$ __7__ $\times$ __700__ $=$ __4900__

$$
\begin{array}{r}
6.09 \\
28 \\
\hline
4872 \\
1218 \\
\hline
170.52
\end{array}
$$

$$
\begin{array}{r}
683 \\
\times\; 6.83 \\
\hline
2049 \\
5464 \\
4098 \\
\hline
4664.89
\end{array}
$$

g. $6.09 \times 208 \approx$ __6__ $\times$ __200__ $=$ __1200__   h. $171.76 \times 555 \approx$ __170__ $\times$ __600__ $=$ __102,000__

$$
\begin{array}{r}
208 \\
\times\; 6.09 \\
\hline
1872 \\
1248 \\
\hline
126632
\end{array}
$$

$$
\begin{array}{r}
171.76 \\
\times 555 \\
\hline
85880 \\
85880 \\
85880 \\
\hline
95,326.80
\end{array}
$$

3. Eric's goal is to walk 2.75 miles to and from the park every day for an entire year. If he meets his goal, how many miles will Eric walk?

$2.75 \times (2 \times 365)$

$$
\begin{array}{r}
365 \\
\times\; 2 \\
\hline
730
\end{array}
$$

$$
\begin{array}{r}
2.75 \\
\times 730 \\
\hline
825 \\
1925 \\
\hline
2007.50
\end{array}
$$

Eric will walk 2,007.50 miles

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?

$22.5 \times 34 \times \$4.15$

The selling price is $3,174.75

$$
\begin{array}{r}
22.5 \\
\times 34 \\
\hline
900 \\
675 \\
\hline
765.0
\end{array}
$$

$$
\begin{array}{r}
765 \\
\times\; 4.15 \\
\hline
3825 \\
765 \\
3060 \\
\hline
3,174.75
\end{array}
$$

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?

$(1.25 \times 10) + (0.55 \times 2)$

$12.50 + 1.10$

$$
\begin{array}{r}
12.50 \\
+\; 1.10 \\
\hline
13.60
\end{array}
$$

Gerry will spend $13.60

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

Name _____ Date _____

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

a. Convert weeks to days.	b. Convert years to days.
8 weeks = 8 × (1 week)	4 years = ___4___ × (___1___ year)
= 8 × (7 days)	= ___4___ × (__365__ days)
= 56 days	= __1,460__ days $\begin{array}{r}\overset{2\ 2}{365}\\ \times\ 4\\ \hline 1,460\end{array}$
c. Convert meters to centimeters.	d. Convert yards to feet.
9.2 m = __9.2__ × (___1___ m)	5.7 yards $= 5.7 \times (1\,yard)$
= __9.2__ × (__100__ cm)	$= 5.7 \times (3\,feet)$
= __920.0__ cm	$= 17.1\ feet$
e. Convert kilograms to grams.	f. Convert pounds to ounces.
6.08 kg $\begin{aligned} &= 6.08 \times (1\,kg) \\ &= 6.08 \times (1000g) \\ &= 6,080.00\ g \end{aligned}$	12.5 pounds $\begin{aligned} 12.5 \times (1\ pound)\\ = 12.5 \times (16\ ounces)\\ = 200\ ounces \end{aligned}$ $\begin{array}{r}12.5\\ \times 16\\ \hline 750\\ 125\\ \hline 200.0\end{array}$

EUREKA MATH

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

57

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.	b. A small female gorilla weighs 68 kilograms. How much does she weigh in grams?

24 hours = 24 × (1 hour)
          = 24 × (60 minutes)
          = 1,440 minutes
 	
One day has 24 hours, which is the same as 1,440 minutes.
	$68 kg \times 1,000 g$
	$= 68,000 g$
	
	1 Kilogram is 1,000 g

c. The height of a man is 1.7 meters. What is his height in centimeters?	d. The capacity of a syringe is 0.08 liters. Convert this to milliliters.
$1.7 m \times 100 cm$ $= 170.0 cm$ 1 meter is 100 centimeters	$0.08 L \times 1,000 mL$ 80.00 1 liter equals 1,000 milliliters
e. A coyote weighs 11.3 pounds. Convert the coyote's weight to ounces.	f. An alligator is 2.3 yards long. What is the length of the alligator in inches?
$11.3 \times 16 = 180.8$ $\begin{array}{r} 11.3 \\ \times 16 \\ \hline 678 \\ 113 \\ \hline 180.8 \end{array}$ 1 pound equals 16 ounces	$2.3 y \times 36 in = 828 in$ $\begin{array}{r} 36 \\ 2.3 \\ \hline 108 \\ 72 \\ \hline 828 \end{array}$ One yard equals 36 inches

Name _____ Date _____

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

a. Convert weeks to days.	b. Convert years to days.
6 weeks = 6 × (1 week) = 6 × (7 days) = 42 days	7 years = ___7___ × (___1___ year) = ___7___ × (___365___ days) = _2,455_ days

c. Convert meters to centimeters.	d. Convert pounds to ounces.
4.5 m = ___4.5___ × (___1___ m) = ___4.5___ × (___100___ cm) = _450.0_ cm	12.6 pounds = 12.6 × (1 pound) = 12.6 lb × (16 oz) = 201.6 oz

e. Convert kilograms to grams.	f. Convert yards to inches.
3.09 kg 3.09 × (1 kg) = 3.09 Kg × (1,000 g) = 3,690 g	245 yd 245 × (1 yd) = 245 × 36 in = 8820 in = 8,820 in

Worked calculations (margin):

$$\overset{1\ 3}{12.6} \times \overset{}{16}$$
756
126
201.6

$$\overset{1\ 1}{\underset{}{245}} \times 36$$
1470
735
8820

EUREKA MATH

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

59

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.	b. A newborn giraffe weighs about 65 kilograms. How much does it weigh in grams?

a. Convert the number of hours in a day to minutes.

$$24 \text{ hours} = 24 \times (1 \text{ hour})$$
$$= 24 \times (60 \text{ minutes})$$
$$= 1,440 \text{ minutes}$$

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?

$65 kg \times 1,000g$

$65,000 g$

One Kilogram has 1,000 grams

c. The average height of a female giraffe is 4.6 meters. What is her height in centimeters?

$4.6 m \times 100g = 460g$

One meter has 100 a hundred centimeters

d. The capacity of a beaker is 0.1 liter. Convert this to milliliters.

$0.1 L \times 1000 mL = 100 mL$

One liter equals one thousand milliliters

e. A pig weighs 9.8 pounds. Convert the pig's weight to ounces.

$9.8 lb \times 16 oz = 156.8$

One pound has sixteen ounces

$$\begin{array}{r} \overset{4}{9}.8 \\ \times 16 \\ \hline 588 \\ 98 \\ \hline 156.8 \end{array}$$

f. A marker is 0.13 meters long. What is the length in millimeters?

$0.13 m \times 1,000 mm$

$130 mm$

One meter has one thousand millimeters

0cm · 10cm · 20cm

30cm · 40cm · 50cm

60cm · 70cm · 80cm

90cm · 100cm

meter strip

61
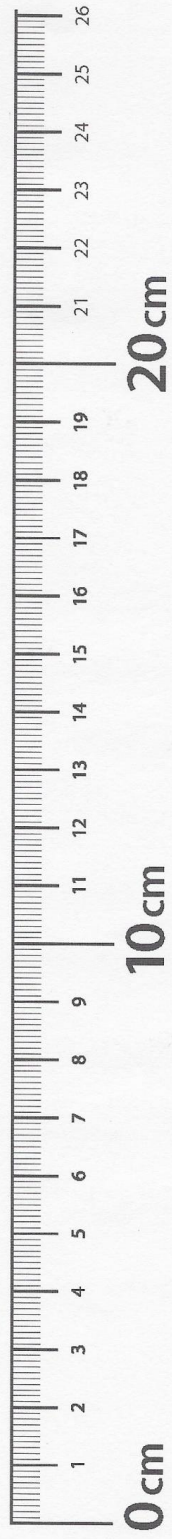
NOTHING

O N

THIS

PAGE

Name _____   Date _____

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

a. Convert days to weeks.

28 days = 28 × (1 day)

$= 28 \times \left(\frac{1}{7} \text{ week}\right)$

$= \frac{28}{7}$ week

= 4 weeks

b. Convert quarts to gallons.

20 quarts = __20__ × (1 quart)

$= \underline{20} \times \left(\frac{1}{4} \text{ gallon}\right)$

$= \underline{20/4}$ gallons

$= \underline{5}$ gallons

c. Convert centimeters to meters.

920 cm = __920__ × (__1__ cm)

$= \underline{920} \times \left(\frac{1}{100}\right)$ m)

$= \underline{9.2}$ m

d. Convert meters to kilometers.

1,578 m = __1,578__ × (__1__ m)

$= \underline{1,578} \times (0.001 \text{ km})$

$= \underline{1.578}$ km

e. Convert grams to kilograms.

6,080 g = 6,080 × (1 g)

$6{,}080 \text{ g} \times \frac{1}{1000} \text{ kg}$

6.08 kg

f. Convert milliliters to liters.

509 mL = 509 × (1 mL)

$509 \text{ mL} \times \frac{1}{1,000}$

0.509 L

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

a. The screen measures 24 inches. Convert 24 inches to feet. $24 \text{ inches} = 24 \times (1 \text{ inch})$ $= 24 \times \left(\frac{1}{12} \text{ feet}\right)$ $= \frac{24}{12} \text{ feet}$ $= 2 \text{ feet}$ The screen measures 24 inches or 2 feet.	b. A jug of syrup holds 12 cups. Convert 12 cups to pints. $12 \text{ cups} = 12 \times (1 \text{ cup})$ $= 12 \times \left(\frac{1}{2} \text{ pint}\right)$ $= \frac{12}{2} \text{ pints}$ $= 6 \text{ pints}$
c. The length of the diving board is 378 centimeters. What is its length in meters? $378 \text{ cm} = 378 \times (1 \text{ cm})$ $= 378 \times \left(\frac{1}{100} \text{ m}\right)$ $= \frac{378}{100} \text{ meters}$ $= 3.78 \text{ m}$	d. The capacity of a container is 1,478 milliliters. Convert this to liters. $1,478 \text{ mL} = 1,478 \times (1 \text{ mL})$ $= 1,478 \times \left(\frac{1}{1,000} \text{ L}\right)$ $= \frac{1,478}{1,000} \text{ liters}$ $= 1.478 \text{ L}$
e. A truck weighs 3,900,000 grams. Convert the truck's weight to kilograms. $3,900,000 \text{ g} = 3,900,000 \times (1 \text{ gram})$ $= 3,900,000 \times \left(\frac{1}{1000} \text{ kg}\right)$ $= \frac{3,900,000}{1000} \text{ kg}$ $= 3,900 \text{ kg}$	f. The distance was 264,040 meters. Convert the distance to kilometers. $264,040 \text{ m} = 264,040 \times (1 \text{ m})$ $= 264,040 \times \left(\frac{1}{1,000} \text{ km}\right)$ $= \frac{264,040}{1,000} \text{ kg}$ $= 264.040 \text{ kg}$

EUREKA MATH™

Lesson 14: Use fraction and decimal 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.	b. Convert quarts to gallons.
42 days = 42 × (1 day)	36 quarts = __36__ × (1 quart)
$= 42 \times \left(\frac{1}{7} \text{ week}\right)$	$= \underline{36} \times \left(\frac{1}{4} \text{ gallon}\right)$
$= \frac{42}{7}$ week	$= \frac{36}{4}$ gallons
= 6 weeks	= __9__ gallons

c. Convert centimeters to meters.	d. Convert meters to kilometers.
760 cm = __760__ × (__1__ cm)	2,485 m = __2,485__ × (__1__ m)
$= \underline{760} \times \left(\frac{1}{100} \text{ m}\right)$	$= \underline{2,485} \times (0.001 \text{ km})$
$= \underline{7.6}$ m	$= \underline{2.485}$ km

e. Convert grams to kilograms.	f. Convert milliliters to liters.
3,090 g = $3,090 \times (1g)$	205 mL = $205 \times (1 \text{ mL})$
$= 3,090 \times \left(\frac{1}{1,000} \text{ kg}\right)$	$= 205 \times \left(\frac{1}{1,000} \text{ L}\right)$
$= \frac{3,090}{1,000}$ kg	$= \frac{205}{1,000}$
$= 3.09$ kg	$= 0.205$ L

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

Name _____   Date _____

Solve.

1. Liza's cat had six kittens! When Liza and her brother weighed all the kittens together, they weighed 4 pounds 2 ounces. Since all the kittens are about the same size, about how many ounces does each kitten weigh?

4 pounds 2 ounces
= 64 ounces + 2 ounces
= 66 ounces

$$\begin{array}{r} 16 \\ \times 4 \\ \hline 64 \end{array}$$

$$6\overline{)66}$$

Each kitten weighs 11 ounces

2. A container of oregano is 17 pounds heavier than a container of peppercorns. Their total weight is 253 pounds. The peppercorns will be sold in one-ounce bags. How many bags of peppercorns can be made?

Oregano = P + 17 pounds
Peppercorns = ? pounds
Total = 253 pounds

peppercorns   oregano
(118)   (118+17)
pounds   pounds

17 = 253 pounds

$$\begin{array}{r} 253 \\ - 17 \\ \hline 236 \end{array}$$

$$2\overline{)236} = 118$$

118 lb × 16 oz = 1,888 oz

$$\begin{array}{r} 118 \\ \times 16 \\ \hline 708 \\ 118 \\ \hline 1,888 \end{array}$$

1,888 bags of peppercorns can be made.

EUREKA
MATH

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

3. Each costume needs 46 centimeters of red ribbon and 3 times as much yellow ribbon. What is the total length of ribbon needed for 64 costumes? Express your answer in meters.

Each Costume needs:

red 46 cm

yellow (46 × 3)
= 138 cm

Total number of costumes
64

| 46cm | 138cm | = 1 bag (184cm) |
| red | yellow | |

red   yellow

| 184 | 184 | ... | 184 | 184 |

64

11,776 cm × 0.01 =
117.76 m

$$\begin{array}{r} 138 \\ + 46 \\ \hline 184 \end{array}$$

$$\begin{array}{r} 184 \\ \times 64 \\ \hline 736 \\ 1104 \\ \hline 11,776 \end{array}$$

The total lenght of ribbon is 117.76 m

4. When making a batch of orange juice for her basketball team, Jackie used 5 times as much water as concentrate. There were 32 more cups of water than concentrate.

ratio!

a. How much juice did she make in all?

cups
5 water
1 concentrate

32 more water than concentrate

5 ⊖ 1 = 4
40 ⊖ 8 = 32

water concentrate total
5 + 1 = 6
10 + 2 = 12
15 + 3 = 18
20 + 4 = 24
25 + 5 = 30
30 + 6 = 36
35 + 7 = 42
40 + 8 = 48

$$\begin{array}{r} 40 \\ - 8 \\ \hline 32 \end{array}$$

Jackie made 48 cups in all.

b. She poured the juice into quart containers. How many containers could she fill?

48 cups = 48 × (1 cup)

= 48 × ($\frac{1}{4}$ quart)

= $\frac{48}{4}$

= 12   Jackie can fill 12 containers

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?

Tia 4.08m or 408cm

Marta 5.40m or 540cm

$408 \div 10 =$ 40.8cm

$540 \div 9 =$ 60 cm

$$\begin{array}{r} 5\,9 \\ 80.0 \\ -40.8 \\ \hline 19.2 \end{array}$$

$$\begin{array}{r} 60 \\ 9\overline{)540} \\ 54 \\ \hline 00 \end{array}$$

Marta's is 19.2 cm longer than 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 = ? +19qt

inside = ?

Total = 107 quarts

| ? | ? | | = 107

inside outside

(44qt) (44qt)

$$\begin{array}{r} ^{9}\!10\,7 \\ - \; 19 \\ \hline 88 \end{array}$$

$$\begin{array}{r} 44 \\ 2\overline{)88} \\ 8 \\ \hline 08 \\ 8 \\ \hline 0 \end{array}$$

Jay will need 44qts to paint the inside of his barn.

EUREKA
MATH

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

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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.

$A = 35cm$

$B = 35cm \times 5$
$\quad = 175cm$

bottles = 17

175	35	= ? (210 cm)
B	A

| 210 | 210 | ... | 210 | 210 | = ? |

17

$3,570 cm = 35.70m$

$$\begin{array}{r} 175 \\ + 35 \\ \hline 210 \end{array}$$

$$\begin{array}{r} 210 \\ \times 17 \\ \hline 1470 \\ 210 \\ \hline 3,570 \end{array}$$

The total length is 35.70 m

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?

pineapple   7
orange   1

870g

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | = ?
pineapple   orange

pineapple   870g more than
orange   ? g   orange

$$\begin{array}{r} 145 \\ 6\overline{\smash{\big)}870} \\ \underline{6} \\ 27 \\ \underline{24} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

$$\begin{array}{r} 145 \\ \times 8 \\ \hline 1160 \end{array}$$

Both weigh 1160 grams

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

$1160g \times 0.01 Kg = 11.6 Kg$

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

Name _____   Date _____

1. Divide. Draw place value 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. 500 ÷ 10	b. 360 ÷ 10
(100)(100)(100)(100)(100)(100) ÷10 (10)(10)(10)(10)(10) 50	36
c. 12,000 ÷ 100	d. 450,000 ÷ 100
(10,000)(1,000)(1,000) ÷100 (100)(10)(10) 120	4,500
e. 700,000 ÷ 1,000	f. 530,000 ÷ 100
700	5300

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

a. 12,000 ÷ 30	b. 12,000 ÷ 300	c. 12,000 ÷ 3,000
= 12,000 ÷ 10 ÷ 3 = 1,200 ÷ 3 = 400	= 12,000 ÷ 100 ÷ 3 = 120 ÷ 3 = 40	= 12,000 ÷ 1,000 ÷ 3 = 12 ÷ 3 = 4
d. 560,000 ÷ 70	e. 560,000 ÷ 700	f. 560,000 ÷ 7,000
= 560,000 ÷ 10 ÷ 7 = 56,000 ÷ 7 = 8,000	= 560,000 ÷ 100 ÷ 7 = 5,600 ÷ 7 = 800	= 560,000 ÷ 1,000 ÷ 7 = 560 ÷ 7 = 80

g. 28,000 ÷ 40	h. 450,000 ÷ 500	i. 810,000 ÷ 9,000
$= 28,000 \div 10 \div 4$	$= 450,000 \div 100 \div 5$	$= 810,000 \div 1,000 \div 9$
$= 2,800 \div 4$	$= 4,500 \div 5$	$= 810 \div 9$
$= 700$	$= 900$	$= 90$

3. The floor of a rectangular banquet hall has an area of 3,600 m². The length is 90 m.
    a. What is the width of the banquet hall?

90 m
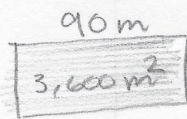
3,600 m²

$A = L \times W$

$W = A \div L$

$W = 3,600 \div 90$

$W = 40$

The width is 40 m

    b. A square banquet hall has the same area. What is the length of the room?
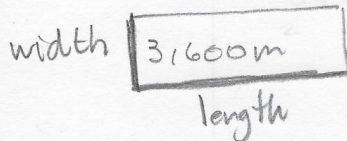
3,600 m²

$A = S \times S$ (gaineccelleither)

$S = A \div S$

$S = 3,600 \div 60$

The side of the room is 60 m²

    c. A third rectangular banquet hall has a perimeter of 3,600 m. What is the width if the length is 5 times the width?

width   3,600 m
length

$P = 2 \times (l \times w)$

$3600 = 2 \times (l \times w) \quad \boxed{3600 \div 2}$

$1800 = l \times w$

$\boxed{L \, L \, L \, L \, L \, w} = 1800$

$1800 \div 6 = 300$

$l = 1500$

$w = 300$

The width is 300 m

4. Two fifth graders solved 400,000 divided by 800. Carter said the answer is 500, while Kim said the answer is 5,000.

a. Who has the correct answer? Explain your thinking.

$$400,000 \div 800$$
$$= 400,000 \div 100 \div 8$$
$$= 4,000 \div 8$$
$$= 500$$

$$800 \times 500 = 400,000$$
$$800 \times 5,000 = 4,000,000$$

Carter is right

b. What if the problem is 4,000,000 divided by 8,000? What is the quotient?

$$4,000,000 \div 8,000$$
$$= 4,000,000 \div 1000 \div 8$$
$$= 4,000 \div 8$$
$$= 500$$

$$8,000 \times 500 = 4,000,000$$

Lesson 16:   Use *divide by 10* patterns for multi-digit whole number division.

Name _____ Date _____

1. Divide. Draw place value 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. $300 \div 10$	b. $450 \div 10$
30	45
c. $18,000 \div 100$ 180	d. $730,000 \div 100$ 7,300
e. $900,000 \div 1,000$ 900	f. $680,000 \div 1,000$ 680

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

a. $18,000 \div 20$	b. $18,000 \div 200$	c. $18,000 \div 2,000$
$= 18,000 \div 10 \div 2$ $= 1,800 \div 2$ $= 900$	$18,000 \div 100 \div 2$ $= 180 \div 2$ $= 90$	$= 18,000 \div 1,000 \div 2$ $= 18 \div 2$ $= 9$
d. $420,000 \div 60$	e. $420,000 \div 600$	f. $420,000 \div 6,000$
$= 420,000 \div 10 \div 6$ $= 42,000 \div 6$ $= 7,000$	$= 420,000 \div 100 \div 6$ $= 4200 \div 6$ $= 700$	$= 420,000 \div 1,000 \div 6$ $= 420 \div 6$ $= 70$

g. 24,000 ÷ 30	h. 560,000 ÷ 700	i. 450,000 ÷ 9,000
$= 24,000 \div 10 \div 3$ $= 2,400 \div 3$ $= 800$	$= 560,000 \div 100 \div 7$ $= 5,600 \div 7$ $= 800$	$= 450,000 \div 1,000 \div 9$ $= 450 \div 9$ $= 50$

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

$50,000 \div 256 =$
$50,000 \div 16 \div 25$
$51000 \div 25 =$
200

There are 200 seats in each one.

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?

$160,000 \div 40,000 =$
$160,000 \div 10,000 \div 4 =$
$16 \div 4 =$
4

He will use 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?

$160,000 \div 10,000 =$
16

The trucker will change the oil 16 times

NOTHING
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PAGE