Eureka Math™ Homework Helper

2015–2016

Grade 5
Module 2
Lessons 1–18

Eureka Math, A Story of Units®

Published by the non-profit Great Minds.

G5-M2-Lesson 1

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

   a. 34×20

   Think: 34 ones $\times$ 2 tens $=$ **68 *tens***

   $34 \times 20 =$ **680**

   34 ones $\times$ 2 tens $= (34 \times 1) \times (2 \times 10)$.
   First, I did the mental math: $34 \times 2 = 68$.
   Then I thought about the units. *Ones times tens is tens*.
   68 tens is the same as 680 ones or 680.

   b. 420×20

   Think: 42 tens $\times$ 2 tens $=$ **84 *hundreds***

   $420 \times 20 =$ **8,400**

   First, I'll multiply 42 times 2 in my head because that's a basic fact: 84.
   Next, I have to think about the units. *Tens* times *tens* is *hundreds*.
   Therefore, my answer is 84 hundreds or $8{,}400$.

   Another way to think about this is $42 \times 10 \times 2 \times 10$.
   I can use the associative property to switch the order of the factors: $42 \times 2 \times 10 \times 10$.

   c. 400×500

   4 hundreds $\times$ 5 hundreds $=$ **20 *ten thousands***

   $400 \times 500 =$ **200,000**

   I have to be careful because the basic fact, $4 \times 5 = 20$, ends in a zero.

   Another way to think about this is
   $4 \times 100 \times 5 \times 100$
   $= 4 \times 5 \times 100 \times 100$
   $= 20 \times 100 \times 100$
   $= 20 \times 10{,}000$
   $= 200{,}000$

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

   a. $9 \text{ tens} = 3 \text{ tens} \times 3 \text{ tens}$

   False. The basic fact is correct: $\mathbf{3 \times 3 = 9}$.

   However, the units are not correct: $\mathbf{10 \times 10}$ ***is*** $\mathbf{100}$.

   Correct answers could be $9 \text{ tens} = 3 \text{ tens} \times 3 \text{ ones}$, or $9 \text{ hundreds} = 3 \text{ tens} \times 3 \text{ tens}$.

   b. $93 \times 7 \times 100 = 930 \times 7 \times 10$

   True. I can rewrite the problem. $\mathbf{93 \times 7 \times (10 \times 10) = (93 \times 10) \times 7 \times 10}$

   The associative property tells me that I can group the factors in any order without changing the product.

3. Find the products. Show your thinking.

60×5	60×50	$6{,}000 \times 5{,}000$
$= (\mathbf{6 \times 10}) \times \mathbf{5}$	$= (\mathbf{6 \times 10}) \times (\mathbf{5 \times 10})$	$= (\mathbf{6 \times 1{,}000}) \times (\mathbf{5 \times 1{,}000})$
$= (\mathbf{6 \times 5}) \times \mathbf{10}$	$= (\mathbf{6 \times 5}) \times (\mathbf{10 \times 10})$	$= (\mathbf{6 \times 5}) \times (\mathbf{1{,}000 \times 1{,}000})$
$= \mathbf{30 \times 10}$	$= \mathbf{30 \times 100}$	$= \mathbf{30 \times 1{,}000{,}000}$
$= \mathbf{300}$	$= \mathbf{3{,}000}$	$= \mathbf{30{,}000{,}000}$

I use the distributive property to decompose the factors.

Then, I use the associative property to regroup the factors.

I multiply the basic fact first. Then I think about the units.

I have to be careful because the basic fact, 6×5, has a zero in the product. I multiply the basic fact and then think about the units.

6 tens times 5 is 30 tens. 30 tens is the same as 300. I could get the wrong answer if I just counted zeros.

I can think of this in unit form: 6 thousands times 5 thousands. $6 \times 5 = 30$. The units are thousands times thousands. I can picture a place value chart in my head to solve a thousand times a thousand. A thousand times a thousand is a million. The answer is 30 million, or 30,000,000.

G5-M2-Lesson 2

1. Round the factors to estimate the products.

I round each factor to the largest unit. For example, 387 rounds to 400.

The largest unit in 51 is tens. So, I round 51 to the nearest 10, which is 50.

a. $387 \times 51 \approx$ **400** $\times$ **50** $=$ **20,000**

Now that I have 2 rounded factors, I can use the distributive property to decompose the numbers. $400 \times 50 = (4 \times 100) \times (5 \times 10)$

I can use the associative property to regroup the factors.
$(4 \times 5) \times (100 \times 10) = 20 \times 1{,}000 = 20{,}000$

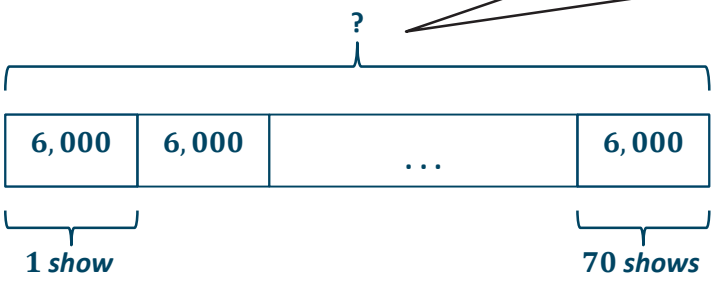
b. $6{,}286 \times 26 \approx$ **6,000** $\times$ **25** $=$ **150,000**

I could have chosen to round 25 to 30. However, multiplying by 25 is mental math for me. If I round 26 to 25, I know my estimated product will be closer to the actual product than if I round 26 to 30.

2. There are $6{,}015$ seats available for each of the Radio City Rockettes Spring Spectacular dance shows. If there are a total of 68 shows, about how many tickets are available in all?

The problem says "about," so I know to estimate.

The unknown is the total number of tickets.



The long bar of the tape diagram indicates the total amount. There are about 70 shows and about $6{,}000$ tickets for each show.

$6{,}000 \times 70$

$= 6 \text{ thousands} \times 7 \text{ tens} = 42 \text{ ten thousands} = 420{,}000$

$= (6 \times 7) \times (1{,}000 \times 10) = 42 \times 10{,}000 = 420{,}000$

About $420{,}000$ tickets are available for the shows.

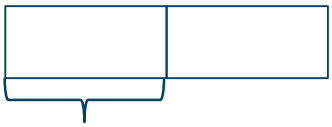
I can think about the problem in more than one way.

G5-M2-Lesson 3

1. Draw a model. Then write the numerical expression.

   a. The sum of 5 and 4, doubled

The directions don't ask me to solve, or evaluate, so I don't have to find the answers.



$5 + 4$

I can show doubling by multiplying by 2 or by adding the two sums together. The tape diagram represents both expressions.

$(5 + 4) \times 2$ *or* $(5 + 4) + (5 + 4)$

"The sum of 5 and 4" means 5 and 4 are being added.

   b. 3 times the difference between 42.6 and 23.9

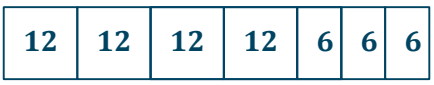
$42.6 - 23.9$

The word difference tells me the expression involves subtraction.

$(42.6 - 23.9) \times 3$

   c. The sum of 4 twelves and 3 sixes

Another way to say 4 *twelves* is to say 4 *groups of twelve.*



I can write the value of each unit inside the tape diagram.

$(4 \times 12) + (3 \times 6)$ *or* $12 + 12 + 12 + 12 + 6 + 6 + 6$

2. Compare the two expressions using >, <, or =.

a. $(2 \times 3) + (5 \times 3)$ $=$ $3 \times (2 + 5)$

Using the commutative property, I know that 7 threes is equal to 3 sevens.

I can think of $(2 \times 3) + (5 \times 3)$ in unit form.
2 threes + 5 threes = 7 threes = 21.

b. $28 \times (3 + 50)$ $<$ $(3 + 50) \times 82$

82 units of fifty-three is more than 28 units of fifty-three.

G5-M2-Lesson 4

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

14×31

I think of this as 14 units of thirty-one.
It's like counting by 31's: 31, 62, 93, 124, … , 434.

14 thirty-ones

31 fourteens

$(13 - 1) \times 31$

$(10 \times 31) - (4 \times 31)$

The commutative property says $14 \times 31 = 31 \times 14$, or
14 thirty-ones = 31 fourteens.

This would be equivalent if it were $13 + 1$ instead.

I think of this as 10 thirty-ones minus 4 thirty-ones. This expression is equal to 6 thirty-ones not 14 thirty-ones.

2. Solve using mental math. Draw a tape diagram and fill in the blanks to show your thinking.

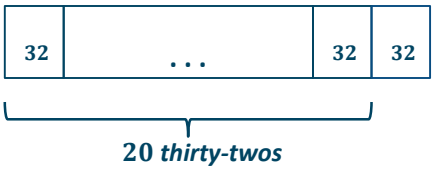
a. $19 \times 25 =$ **19** twenty-fives

Think: 20 twenty-fives − 1 twenty-five

= (**20** × 25) − (**1** × 25)

= **500** − **25** = **475**

b. $21 \times 32 =$ **21** thirty-twos



Think: **20** thirty-twos + **1** thirty-two

= (**20** × 32) + (**1** × 32)

= **640** + **32** = **672**

3. The pet store has 99 fish tanks with 44 fish in each tank. How many fish does the pet store have? Use mental math to solve. Explain your thinking.

   I need to find 99 forty-fours.

   I know that 99 forty-fours is 1 unit of forty-four less than 100 forty-fours.

   I multiplied 100×44, which is $4,400$.

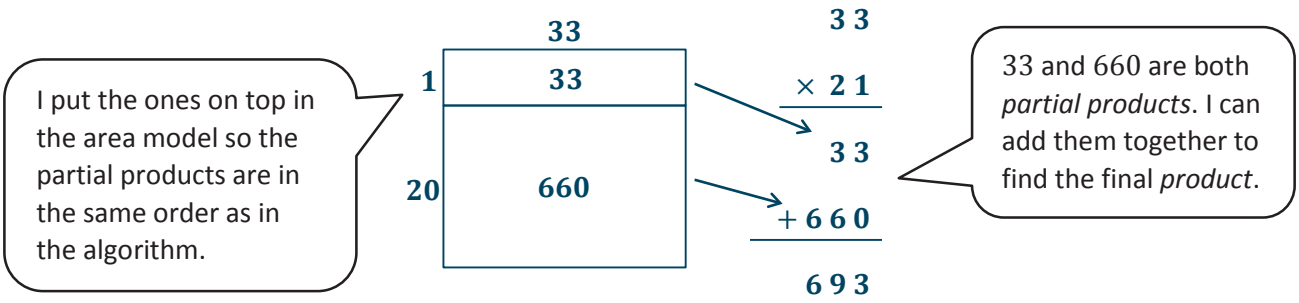
   I need to subtract one group of 44.

   $4,400 - 44$. The pet store has $4,356$ fish.

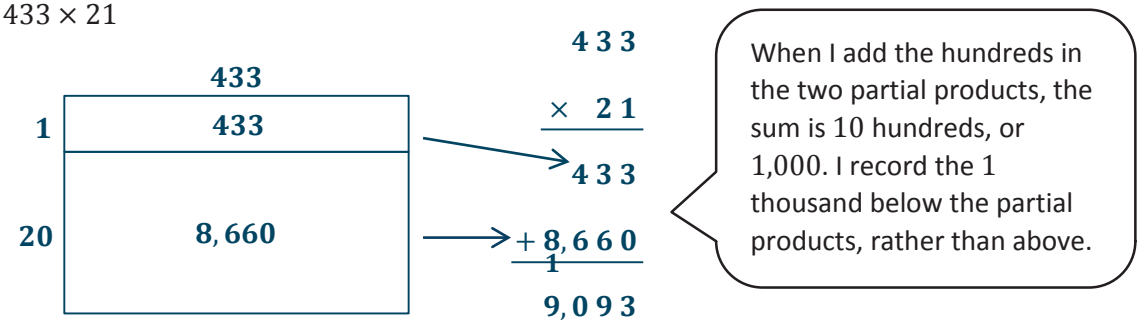
G5-M2-Lesson 5

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.

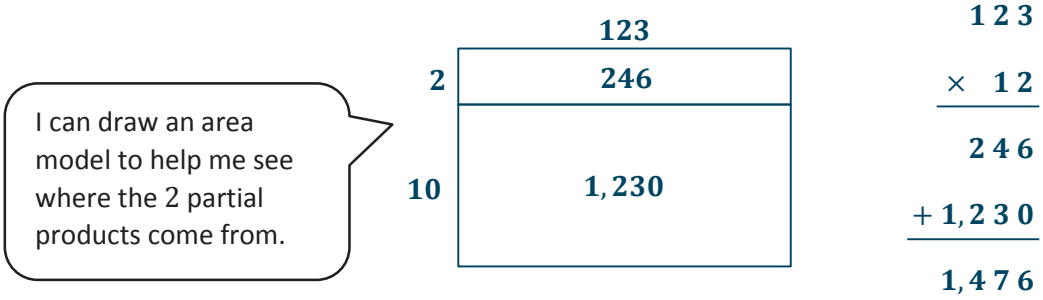
   a. 33×21



   b. 433×21



2. Elizabeth pays $123 each month for her cell phone service. How much does she spend in a year?

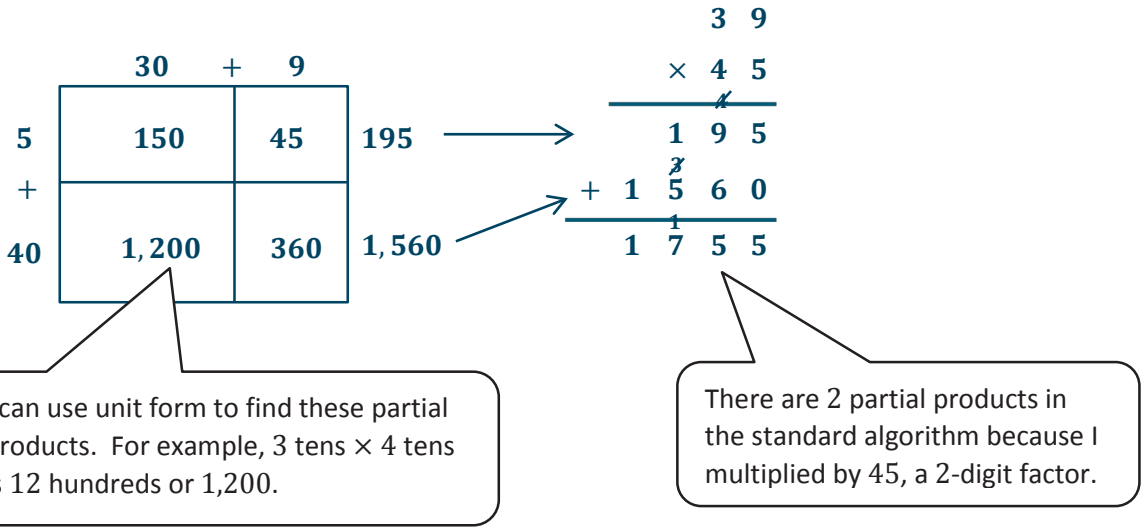


Elizabeth spends $1,476 in a year for cell phone service.

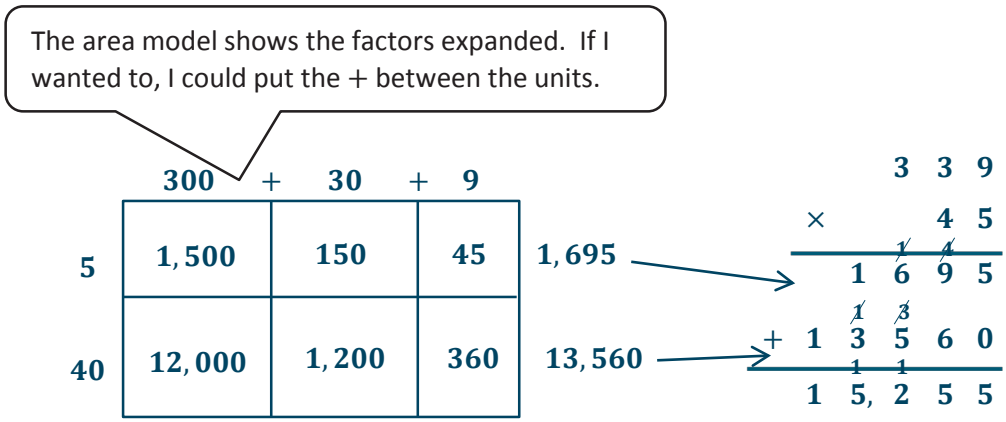
G5-M2-Lesson 6

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. 39×45



   b. 339×45



2. Desmond bought a car and paid monthly installments. Each installment was $452 per month. After 36 months, Desmond still owes $1,567. What was the total price of the car?

I'll find out how much Desmond would pay in 36 months.

$$\begin{array}{r} 452 \\ \times \quad 36 \\ \hline 2712 \\ +\ 13560 \\ \hline 16,272 \end{array}$$

$$\begin{array}{r} 16,272 \\ +\ 1,567 \\ \hline 17,839 \end{array}$$

I'll add what he paid after 36 months to what Desmond still owes.

The total price of the car was $17,839.

I remembered to write a sentence that answers the question.

G5-M2-Lesson 7

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.

$431 \times 246 = \underline{\mathbf{106,026}}$

I can decompose both factors:
$431 = 400 + 30 + 1$
$246 = 200 + 40 + 6.$
Now I can multiply to find the partial products.

I can add to find 6×431.
$2{,}400 + 180 + 6 = 2{,}586$

I'll line up the two factors vertically and multiply using the standard algorithm.

	400	+ 30	+ 1	
6	2,400	180	6	2,586
+				
40	16,000	1,200	40	17,240
+				
200	80,000	6,000	200	86,200

$$\begin{array}{r} 431 \\ \times \quad 246 \\ \hline 2586 \\ 17240 \\ +\ 86200 \\ \hline 106{,}026 \end{array}$$

The partial products I found using the area model are the same as using the standard algorithm.

The total product is 106,026.

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

$2{,}451 \times 107 = \underline{262{,}257}$

I can decompose 2,451 and use it as the length.
$2{,}451 = 2{,}000 + 400 + 50 + 1$

I multiply to find the partial products.

	2,000	+ 400	+ 50	+ 1	
7	14,000	2,800	350	7	17,157
+					
100	200,000	40,000	5,000	100	245,100

$$\begin{array}{r} 2,451 \\ \times \quad 107 \\ \hline 17157 \\ +\,245100 \\ \hline 262,257 \end{array}$$

I decompose the width, 107.
$107 = 100 + 7$
Since there's a 0 in the tens place, there are 0 tens in the width of the area model.

3. Solve using the standard algorithm.

$7{,}302 \times 408 = \underline{2{,}979{,}216}$

8 ones × 3 hundreds = 24 hundreds = 2 thousands 4 hundreds. I'll record 2 in the thousands place and write 4 in the hundreds place.

8 ones × 2 ones = 16 ones = 1 ten 6 ones. I'll record 1 in the tens place and write 6 in the ones place.

$$\begin{array}{r} 7,302 \\ \times \quad 408 \\ \hline 58416 \\ +\,2920800 \\ \hline 2,979,216 \end{array}$$

4 hundreds × 3 hundreds = 12 ten thousands. I'll record 1 in the hundred thousands place and write 2 in the ten thousands place.

4 hundreds + 8 hundreds = 12 hundreds = 1 thousand 2 hundreds. I'll record 1 in the thousands place and write 2 in the hundreds place.

G5-M2-Lesson 8

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

   a. 795×248

   $\approx 800 \times 200$

   $= 160,000$

   I could have rounded 248 to 250 in order to have an estimate that is closer to the actual product. Another reasonable estimate is $800 \times 250 = 200,000$.

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

   $8 \times 5 = 40$, which I record as 4 tens 0 ones. 8×9 tens $= 72$ tens plus 4 tens, makes 76 tens. I record 76 tens as 7 hundreds 6 tens.

   This product is reasonable because $197,160$ is close to $160,000$. My other estimate is also reasonable because $197,000$ is very close to $200,000$.

   b. $4,308 \times 505$

   $\approx 4,000 \times 500$

   $= 2,000,000$

   I have to be careful to estimate accurately. 4 thousands $\times$ 5 hundreds is 20 hundred thousands. That's the same as 2 million. If I just count zeros I might get a wrong estimate.

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

   This partial product is the result of $5 \times 4,308$.

   This partial product is the result of $500 \times 4,308$. It makes sense that it is 100 times greater than the first partial product.

2. When multiplying 809 times 528, Isaac got a product of 42,715. Without calculating, does his product seem reasonable? Explain your thinking.

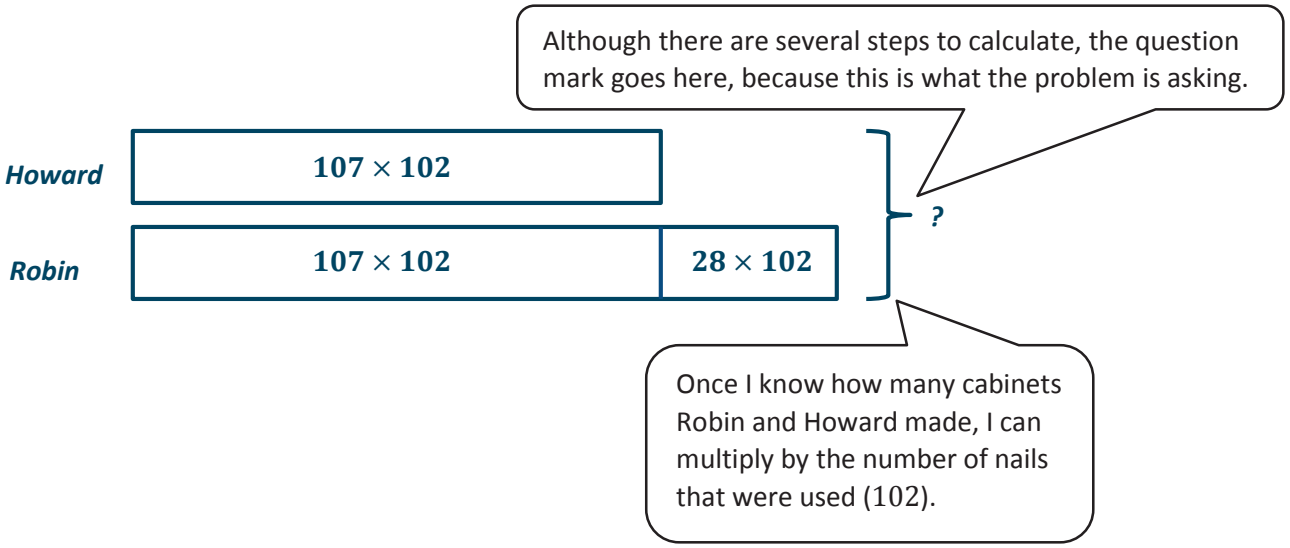
   Isaac's product of about 40 thousands is not reasonable. A correct estimate is 8 hundreds times 5 hundreds, which is 40 ten thousands. That's the same as 400,000 not 40,000.

   I think Isaac rounded 809 to 800 and 528 to 500. Then, I think he multiplied 8 times 5 to get 40. From there, I think he miscounted the zeros.

G5-M2-Lesson 9

Solve.

1. Howard and Robin are both cabinet makers. Over the last year, Howard made 107 cabinets. Robin made 28 more cabinets than Howard. Each cabinet they make has exactly 102 nails in it. How many nails did they use altogether while making the cabinets?



Howard:

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

Robin: $107 + 28 = 135$

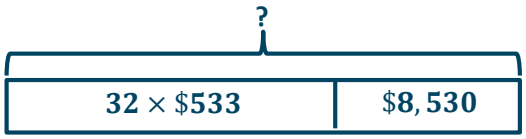
$$\begin{array}{r} 1\ 3\ 5 \\ \times\ 1\ 0\ 2 \\ \hline 2\ 7\ 0 \\ +\ 1\ 3\ 5\ 0\ 0 \\ \hline 1\ 3,\ 7\ 7\ 0 \end{array}$$

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

9 hundreds plus 7 hundreds is equal to 16 hundreds. I'll record 1 in the thousands place and write 6 in the hundreds place.

Together they used 24, 684 nails.

2. Mrs. Peterson made 32 car payments at $533 each. She still owes $8,530 on her car. How much did the car cost?



My tape diagram shows two parts: 32 payments at $533 and the $8,530 she still owes. All I have to do is find both parts and then add!

$$\begin{array}{r} 533 \\ \times \quad 32 \\ \hline 1066 \\ +\,15990 \\ \hline 17,056 \end{array}$$

$$\begin{array}{r} 17,056 \\ +\quad 8,530 \\ \hline 25,586 \end{array}$$

Mrs. Peterson's car cost $25,586.

G5-M2-Lesson 10

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

I round 23 to the nearest ten, 2 tens, and 4.1 to the nearest one, 4 ones.

$23 \times 4.1 \approx \underline{20} \times \underline{4} = \underline{80}$

2 tens × 4 ones = 8 tens, or 80. This is the estimated product.

I rename 4.1 as 41 tenths and then multiply.

$$\begin{array}{r} 2\ 3 \\ \times\ 4\ 1 \quad \text{(tenths)} \\ \hline 2\ 3 \\ +\ 9\ 2\ 0 \\ \hline 9\ 4\ 3 \quad \textit{(tenths)} \end{array} = 94.3$$

943 tenths, or 94.3, is the actual product, which is close to my estimated product of 80.

I decompose 23 to 20 + 3, and 41 tenths to 40 tenths + 1 tenth.

	40	+ 1 *(tenths)*	
3	120	3	123 *tenths*
+			
20	800	20	820 *tenths*

120 tenths + 3 tenths = 123 tenths.

800 tenths + 20 tenths = 820 tenths.

123 tenths + 820 tenths = 943 tenths, or 94.3.

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

I round 7.1 to the nearest one, 7 ones, and 29 to the nearest ten, 3 tens.

a. $7.1 \times 29 \approx \underline{7} \times \underline{30} = \underline{210}$

7 ones × 3 tens = 21 tens, or 210. This is the estimated product.

$$\begin{array}{r} 7\ 1 \text{ (tenths)} \\ \times\ 2\ 9 \\ \hline 6\ 3\ 9 \\ +\ 1\ 4\ 2\ 0 \\ \hline 2,\ 0\ 5\ 9 \end{array}$$

(tenths) $= 205.9$

2,059 tenths, or 205.9, is the actual product, which is close to my estimated product of 210.

I round 182.4 to the nearest hundreds, 2 hundreds, and 32 to the nearest tens, 3 tens.

b. $182.4 \times 32 \approx \underline{200} \times \underline{30} = \underline{6,000}$

2 hundreds × 3 tens = 6 thousandths, or 6,000. This is the estimated product.

$$\begin{array}{r} 1\ 8\ 2\ 4 \text{ (tenths)} \\ \times\ \ \ 3\ 2 \\ \hline 3\ 6\ 4\ 8 \\ +\ 5\ 4\ 7\ 2\ 0 \\ \hline 5\ 8,\ 3\ 6\ 8 \end{array}$$

(tenths) $= 5,836.8$

58,368 tenths, or 5,836.8, is the actual product, which is close to my estimated product of 6,000.

G5-M2-Lesson 11

1. Estimate the product. Solve using the standard algorithm. Use the thought bubbles to show your thinking.

$1.24 \approx 1$
$32 \approx 30$
The estimated product is 30.

$1.24 \times 32 \approx \underline{\mathbf{1}} \times \underline{\mathbf{30}} = \underline{\mathbf{30}}$

The actual product is 39.68.

$1.24 \times 32 = \underline{\mathbf{39.68}}$

Think!
$\mathbf{1.24 \times 100 = 124.}$

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

Think!
$\mathbf{3,968}$ ***is*** $\mathbf{100}$ ***times too large. The real product is*** $\mathbf{3,968 \div 100 = 39.68.}$

If I multiply 1.24 times 100, I get 124. Now, I can multiply whole numbers, 124×32.

Since I multiplied the factor 1.24 times 100, then I have to divide the product by 100. The answer is 39.68.

2. Solve using the standard algorithm.

2.46×132

$= 324.72$

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

2.46 times 100 is equal to 246. Now, I can multiply 246 times 132.

I have to remember to divide the product by 100. $32{,}472 \div 100 = 324.72$

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

If $54 \times 736 = 39{,}744$, then $54 \times 7.36 =$ **397.44**.

7.36 is 736 hundredths, so I can just divide 39,744 by 100.

$39{,}744 \div 100 = 397.44$

I can compare the factors in both number sentences. Since $736 \div 100 = 7.36$, then I can divide the product by 100.

G5-M2-Lesson 12

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

$14 \times 3.12 \approx$ **10** $\times$ **3** $=$ **30**

$14 \approx 10$
$3.12 \approx 3$
The estimated product is 30.

$$\begin{array}{r} 3.12 \\ \times \quad 14 \\ \hline 1248 \\ +3120 \\ \hline 43.68 \end{array}$$

I have to remember to write the product as a number of hundredths.

I'll decompose 14 as $10 + 4$, and 312 hundredths as 300 hundredths + 10 hundredths + 2 hundredths.

	300	+ **10**	+ **2**	***(hundredths)***
4	**1,200**	**40**	**8**	**1,248** ***hundredths***
+				
10	**3,000**	**100**	**20**	**3,120** ***hundredths***

1,200 hundredths + 40 hundredths + 8 hundredths = 1,248 hundredths.

3,000 hundredths + 100 hundredths + 20 hundredths = 3,120 hundredths.

1,248 hundredths + 3,120 hundredths = 4,368 hundredths, or 43.68.

2. Estimate. Then solve using the standard algorithm.

a. $0.47 \times 32 \approx$ **0.5** $\times$ **30** $=$ **15**

$0.47 \approx 0.5$
$32 \approx 30$
Multiplying 0.5 times 30 is the same as taking half of 30. The estimated product is 15.

I'll think of multiplying $0.47 \times 100 = 47$. Now, I'll think of multiplying 47 times 32.

$$\begin{array}{r} 0.\ 4\ 7 \\ \times\quad 3\ 2 \\ \hline \quad 9\ 4 \\ +\ 1\ 4\ 1\ 0 \\ \hline 1\ 5.\ 0\ 4 \end{array}$$

I have to remember to write the product as a number of hundredths. $1{,}504 \div 100 = 15.04$.

b. $6.04 \times 307 \approx$ **6** $\times$ **300** $=$ **1,800**

$6.04 \approx 6$
$307 \approx 300$
6 ones times 3 hundreds is equal to 18 hundreds, or 1,800.

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

The actual product is 1,854.28, which is very close to my estimated product of 1,800.

3. Tatiana walks to the park every afternoon. In the month of August, she walked 2.35 miles each day. How far did Tatiana walk during the month of August?

There are 31 days in August.

Tatiana walked 72.85 miles in August.

I'll multiply 2.35 times 31 days to find the total distance Tatiana walks during the month of August.

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

G5-M2-Lesson 13

1. Solve.

   a. Convert years to days.

   $5 \text{ years} = 5 \times (1 \text{ year})$

   $= 5 \times (365 \text{ days})$

   $= 1,825 \text{ days}$

   $$\begin{array}{r} 3\ 6\ 5 \\ \times\quad\ 5 \\ \hline 1,\ 8\ 2\ 5 \end{array}$$

   1 year is equal to 365 days. I can multiply 5 times 365 days to find 1,825 days in 5 years.

   b. Convert pounds to ounces.

   $13.5 \text{ lb.} = 13.5 \times (1 \text{ lb.})$

   $= 13.5 \times (16 \text{ oz.})$

   $= 216 \text{ oz.}$

   $$\begin{array}{r} 1\ 3.\ 5 \\ \times\quad 1\ 6 \\ \hline 8\ 1\ 0 \\ +\ 1\ 3\ 5\ 0 \\ \hline 2\ 1\ 6.\ 0 \end{array}$$

   1 pound is equal to 16 ounces. I can multiply 13.5 times 16 ounces to find that there are 216 ounces in 13.5 pounds.

2. After solving, write a statement to express each conversion.

   a. The height of a male ostrich is 7.3 meters. What is his height in centimeters?

   $7.3 \text{ m} = 7.3 \times (1 \text{ m})$

   $= 7.3 \times (100 \text{ cm})$

   $= 730 \text{ cm}$

   1 meter is equal to 100 centimeters. I multiply 7.3 times 100 centimeters to get 730 centimeters.

   His height is 730 centimeters.

b. The capacity of a container is 0.3 liter. Convert this to milliliters.

$$0.3 \text{ L} = 0.3 \times (1 \text{ L})$$
$$= 0.3 \times (1,000 \text{ ml})$$
$$= 300 \text{ ml}$$

1 liter is equal to 1,000 milliliters. I multiply 0.3 times 1,000 milliliters to get 300 milliliters.

The capacity of the container is 300 milliliters.

G5-M2-Lesson 14

1. Solve.

   a. Convert quarts to gallons.

$$\begin{aligned}28 \text{ quarts} &= \mathbf{28 \times (1 \text{ quart})} \\ &= \mathbf{28 \times \left(\tfrac{1}{4} \text{ gallon}\right)} \\ &= \mathbf{\tfrac{28}{4} \text{ gallons}} \\ &= \mathbf{7 \text{ gallons}}\end{aligned}$$

1 quart is equal to $\frac{1}{4}$ gallon. I multiply 28 times $\frac{1}{4}$ gallon to find 7 gallons is equal to 28 quarts.

   b. Convert grams to kilograms.

$$\begin{aligned}5{,}030 \text{ g} &= \mathbf{5{,}030 \times (1 \text{ g})} \\ &= \mathbf{5{,}030 \times (0.001 \text{ kg})} \\ &= \mathbf{5.030 \text{ kg}}\end{aligned}$$

1 gram is equal to 0.001 kilogram. I multiply 5,030 times 0.001 kilogram to get 5.030 kilograms.

2. After solving, write a statement to express each conversion.

   a. A jug of milk holds 16 cups. Convert 16 cups to pints.

$$\begin{aligned}\mathbf{16 \text{ cups}} &= \mathbf{16 \times (1 \text{ cup})} \\ &= \mathbf{16 \times \left(\tfrac{1}{2} \text{ pint}\right)} \\ &= \mathbf{\tfrac{16}{2} \text{ pints}} \\ &= \mathbf{8 \text{ pints}}\end{aligned}$$

1 cup is equal to $\frac{1}{2}$ pint. I multiply 16 times $\frac{1}{2}$ pint to find that 8 pints is equal to 16 cups.

16 cups is equal to 8 pints.

   b. The length of a table is 305 centimeters. What is its length in meters?

$$\begin{aligned}\mathbf{305 \text{ cm}} &= \mathbf{305 \times (1 \text{ cm})} \\ &= \mathbf{305 \times (0.01 \text{ m})} \\ &= \mathbf{3.05 \text{ m}}\end{aligned}$$

1 centimeter is equal to 0.01 meter. I multiply 305 times 0.01 meter to get 3.05 meters.

The table's length is 3.05 meters.

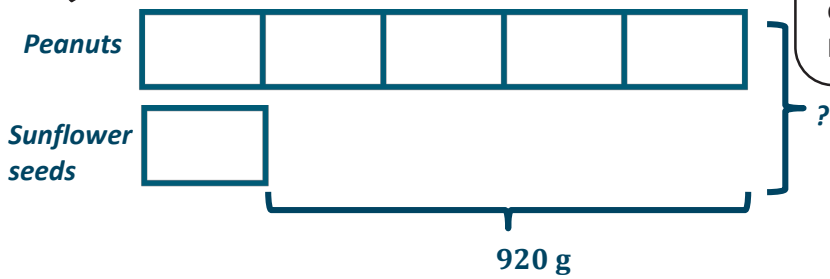
G5-M2-Lesson 15

1. A bag of peanuts is 5 times as heavy as a bag of sunflower seeds. The bag of peanuts also weighs 920 grams more than the bag of sunflower seeds.

   a. What is the total weight in grams for the bag of peanuts and the bag of sunflower seeds?

I need to draw 5 units for the peanuts and 1 unit for the sunflower seeds.

I label the total weight of the peanuts and the sunflower seeds with a question mark. This is what I'm trying to find out.



Since I know 4 units is equal to 920 grams, I'll divide 920 grams by 4 to find the value of 1 unit, which is equal to 230 grams.

$$4 \text{ units} = 920 \text{ g}$$
$$1 \text{ unit} = 920 \text{ g} \div 4$$
$$= 230 \text{ g}$$

$$\begin{array}{r} 230 \\ 4\overline{)920} \\ -\ 8 \\ \hline 12 \\ -\ 12 \\ \hline 00 \\ -\ 0 \\ \hline 0 \end{array}$$

There are a total of 6 units between the peanuts and the sunflower seeds. I multiply 6 times 230 grams to get a total of 1,380 grams.

$$6 \text{ units} = 6 \times 230 \text{ g}$$
$$= 1,380 \text{ g}$$

$$\begin{array}{r} 230 \\ \times\ \ 6 \\ \hline 1,380 \end{array}$$

The total weight for the bag of peanuts and the bag of sunflower seeds is 1,380 grams.

b. Express the total weight of the bag of peanuts and the bag of sunflower seeds in kilograms.

$$1,380 \text{ g} = 1,380 \times (1 \text{ g})$$
$$= 1,380 \times (0.001 \text{ kg})$$
$$= 1.380 \text{ kg}$$

1 gram is equal to 0.001 kilogram. I multiply 1,380 times 0.001 kilogram to find that 1.38 kilograms is equal to 1,380 grams.

The total weight of the bag of peanuts and the bag of sunflower seeds is 1.38 kilograms.

4 meters 50 centimeters is equal to 450 centimeters.

2. Gabriel cut a 4 meter 50 centimeter string into 9 equal pieces. Michael cut a 508 centimeter string into 10 equal pieces. How much longer is one of Michael's strings than one of Gabriel's?

Gabriel: $450 \text{ cm} \div 9 = 50 \text{ cm}$

Each piece of Gabriel's string is 50 centimeters long.

Michael: $508 \text{ cm} \div 10 = 50.8 \text{ cm}$

Each piece of Michael's string is 50.8 centimeters long.

$50.8 \text{ cm} - 50 \text{ cm} = 0.8 \text{ cm}$

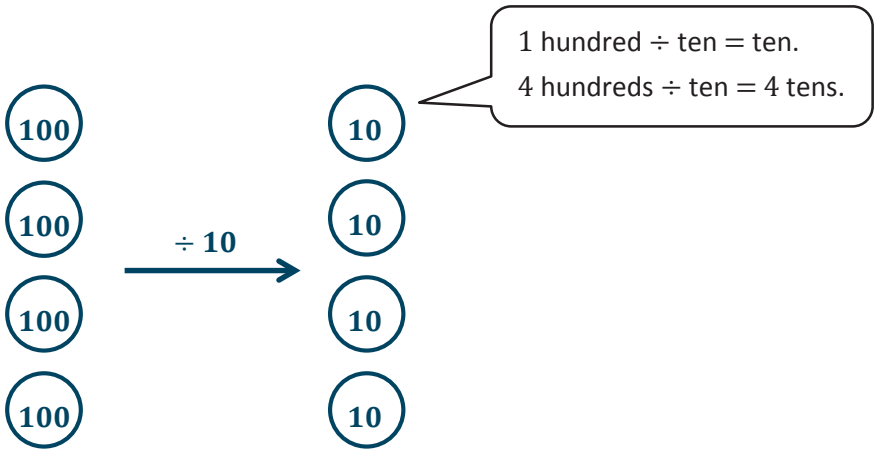
I'll subtract to find the difference between Michael and Gabriel's strings.

One of Michael's strings is 0.8 centimeters longer than one of Gabriel's.

G5-M2-Lesson 16

1. Divide. Draw place value disks to show your thinking for (a).

   a. $400 \div 10 = \mathbf{40}$



   b. $650{,}000 \div 100$

   $= \mathbf{6{,}500 \div 1}$

   $= \mathbf{6{,}500}$

   I can divide both the dividend and the divisor by 100, so I can rewrite the division sentence as $6{,}500 \div 1$. The answer is $6{,}500$.

2. Divide.

   Dividing by 40 is the same thing as dividing by 10 and then dividing by 4.

   a. $240{,}000 \div 40$

   $= \mathbf{240{,}000 \div 10 \div 4}$

   $= \mathbf{24{,}000 \div 4}$

   $= \mathbf{6{,}000}$

   I can solve $240{,}000 \div 10 = 24{,}000$. Then I can find that $24{,}000 \div 4 = 6{,}000$.

   In unit form, this is 24 thousands ÷ 4 = 6 thousands.

b. $240{,}000 \div 400$

$= \mathbf{240{,}000 \div 100 \div 4}$

$= \mathbf{2{,}400 \div 4}$

$= \mathbf{600}$

Dividing by 400 is the same thing as dividing by 100 and then dividing by 4.

I can solve $240{,}000 \div 100 = 2{,}400$. Then I can solve $2{,}400 \div 4 = 600$.

c. $240{,}000 \div 4{,}000$

Dividing by $4{,}000$ is the same thing as dividing by $1{,}000$ and then dividing by 4.

$= \mathbf{240{,}000 \div 1{,}000 \div 4}$

$= \mathbf{240 \div 4}$

$= \mathbf{60}$

I can solve $240{,}000 \div 1{,}000 = 240$. Then I can solve $240 \div 4 = 60$.

G5-M2-Lesson 17

1. Estimate the quotient for the following problems.

a. $612 \div 33$

I look at the divisor, 33, and round it to the nearest ten. $33 \approx 30$

$\approx \mathbf{600 \div 30}$

I need to think of a multiple of 30 that's closest to 612. 600 works.

$= \mathbf{20}$

I use the simple fact, $6 \div 3 = 2$, to help me solve $600 \div 30 = 20$.

b. $735 \div 78$

I look at the divisor, 78, and round it to the nearest ten. $78 \approx 80$

$\approx \mathbf{720 \div 80}$

I'll think of a multiple of 80 that is close to 735. 720 is the closest multiple.

$= \mathbf{9}$

I use the simple fact, $72 \div 8 = 9$, to help me solve $720 \div 80 = 9$.

c. $821 \div 99$

I look at the divisor, 99, and round to the nearest ten. $99 \approx 100$

$\approx \mathbf{800 \div 100}$

I can think of a multiple of 100 that is close to 821. 800 is the closest multiple.

$= \mathbf{8}$

I can use the simple fact, $8 \div 1 = 8$, to help solve $800 \div 100 = 8$.

2. A baker spent $\$989$ buying 48 pounds of nuts. About how much does each pound of nuts cost?

To find the cost of 1 pound of nuts, I'll use division. $989 \div 48$

$\mathbf{989 \div 48}$

I look at the divisor, 48, and round it to the nearest ten. $48 \approx 50$

$\mathbf{\approx 1{,}000 \div 50}$

I need to think of a multiple of 50 that's close to 989. $1{,}000$ is closest.

$\mathbf{= 20}$

I can use the simple fact, $10 \div 5 = 2$, to help me solve $1{,}000 \div 50 = 20$.

Each pound of nuts costs about $\$20$.

G5-M2-Lesson 18

1. Estimate the quotients for the following problems.

a. $3{,}782 \div 23$

$\approx \mathbf{4{,}000 \div 20}$

$= \mathbf{200}$

I look at the divisor, 23, and round it to the nearest ten. $23 \approx 20$

I need to think of a multiple of 20 that's closest to 3,782. 4,000 is closest.

I use the simple fact, $4 \div 2 = 2$, and unit form to help me solve.
4 thousands ÷ 2 tens = 2 hundreds

b. $2{,}519 \div 43$

$\approx \mathbf{2{,}400 \div 40}$

$= \mathbf{60}$

I look at the divisor, 43, and round to the nearest ten. $43 \approx 40$

I need to think of a multiple of 40 that's close to 2,519. 2,400 is closest.

I can use the simple fact, $24 \div 4 = 6$, to help me solve $2{,}400 \div 40 = 60$.

c. $4{,}621 \div 94$

$\approx \mathbf{4{,}500 \div 90}$

$= \mathbf{50}$

I look at the divisor, 94, and round it to the nearest ten. $94 \approx 90$

4,500 is close to 4,621 and is a multiple of 90.

I can use the simple fact, $45 \div 9 = 5$, to help me solve $4{,}500 \div 90 = 50$.

2. Meilin has saved $\$4{,}825$. If she is paid $\$68$ an hour, about how many hours did she work?

I'll use division to find the number of hours that Meilin worked to save $\$4{,}825$.

The divisor, 68, rounds to 70. $68 \approx 70$

$\mathbf{4{,}825 \div 68}$

$\mathbf{\approx 4{,}900 \div 70}$

I need to find a multiple of 70 that's closest to $4{,}825$. $4{,}900$ is closest.

$\mathbf{= 70}$

I can use the basic fact, $49 \div 7 = 7$, to help me solve $4{,}900 \div 70 = 70$.

Meilin worked about 70 hours.