

ThemeVille[™]
Math
See the themes behind the details

Avi Patil, Ph.D.

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ThemeVille Math 3

Worktext

Second Edition

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Area

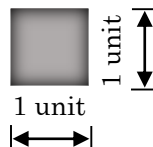
Length is measured in units for this lesson.

Length of 1 unit line is written as shown:



Area of a square 1 unit x 1 unit:

$$\text{Area} = 1 \times 1 = 1 \text{ unit}^2$$



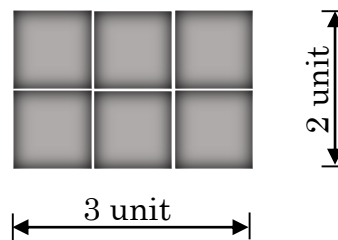
Area of 1 unit² is also called a 'unit cell'.

Rectangle of size 3 unit x 2 unit:

$$\text{Total area} = 3 \times 2 = 6 \text{ unit}^2$$

$$\text{Area of a unit cell} = 1 \times 1 = 1 \text{ unit}^2$$

$$\text{Total number of unit cells} = 6$$

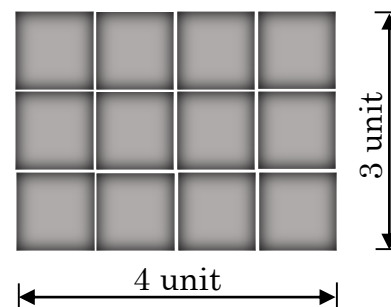


Rectangle of size ... unit x ... unit:

$$\text{Total area} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Area of a unit cell} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Total number of unit cells} = \dots$$

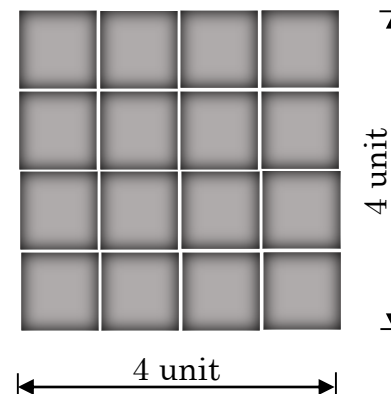


Rectangle of size ... unit x ... unit:

$$\text{Total area} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Area of a unit cell} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Total number of unit cells} = \dots$$

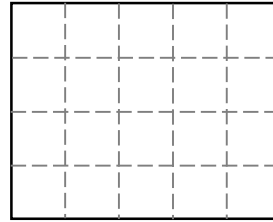


Rectangle of size 5 unit x 4 unit

$$\text{Area} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Area of a unit cell} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Number of unit cells} = \dots$$

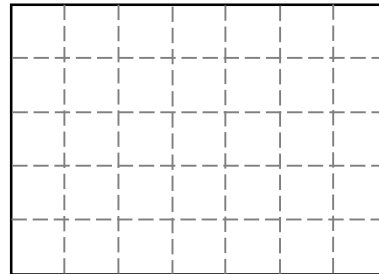


Rectangle of size 5 unit x 7 unit

$$\text{Area} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Area of a unit cell} = \dots \times \dots = \dots \text{ unit}^2$$

$$\text{Number of unit cells} = \dots$$



Baker baked brownies in a rectangular pan of size 8 units x 4 units.

What is the total area of brownies?

$$\dots \times \dots = \dots \text{ unit}^2$$

He baked brownies with a total area of unit^2

If he cuts brownies into pieces of 1 unit x 1 unit, he will have
pieces altogether.

Baker baked brownies in a rectangular pan of size 9 units x 7 units.

What is the total area of brownies?

$$\dots \times \dots = \dots \text{ unit}^2$$

He baked brownies with a total area of unit^2

If he cuts brownies into pieces of 1 unit x 1 unit, he will have
pieces altogether.

To the Teacher: (1) Material needed: Area Overlays (2) After solving each problem on this page, please ask student to show the area with overlays.

Skip Counting

Skip count by 20 for the following numbers:

500, 520, , , ,

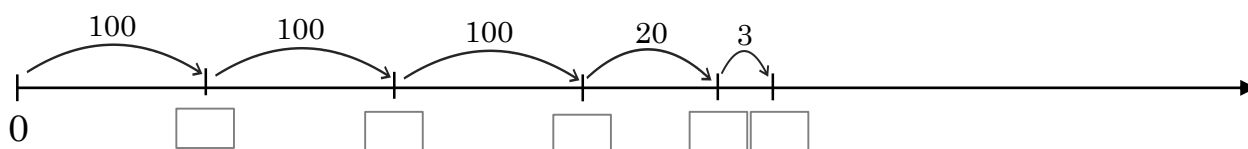
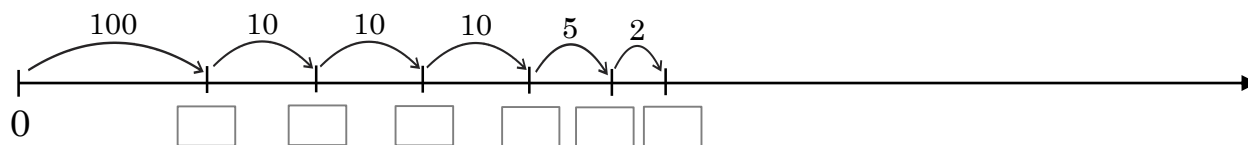
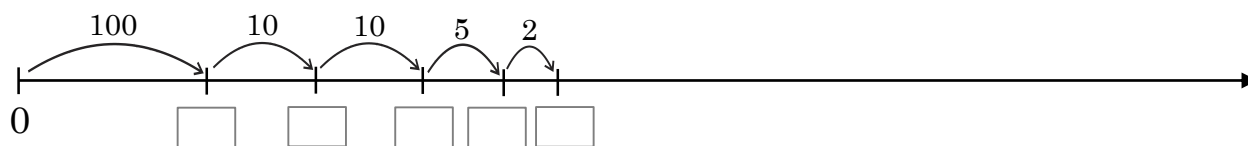
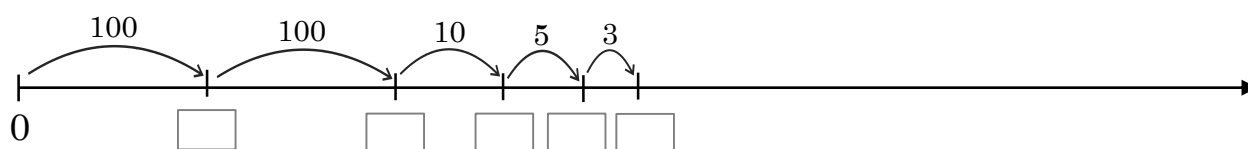
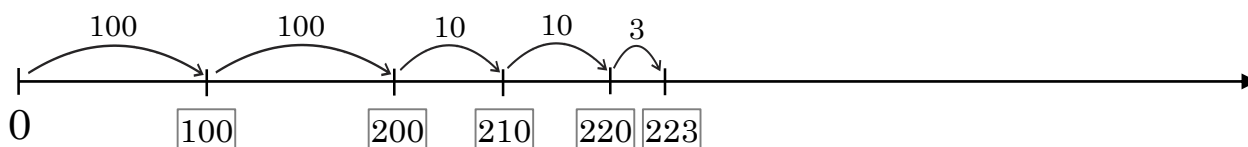
600, 620, , , ,

700, 720, , , ,

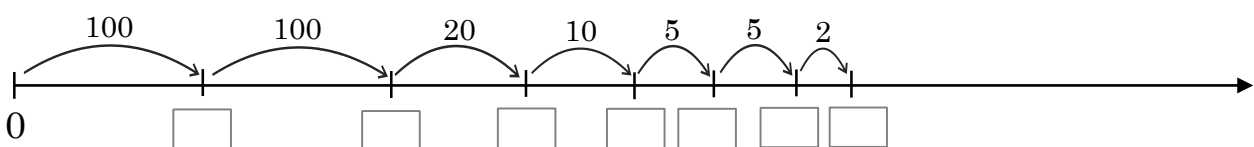
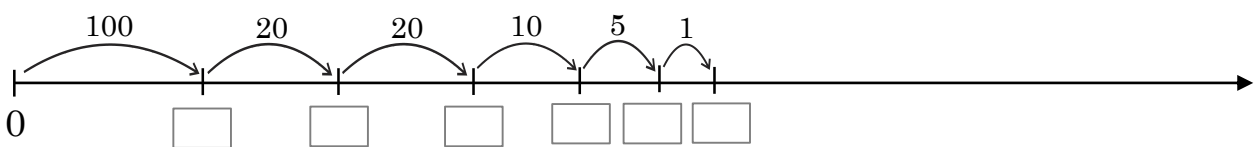
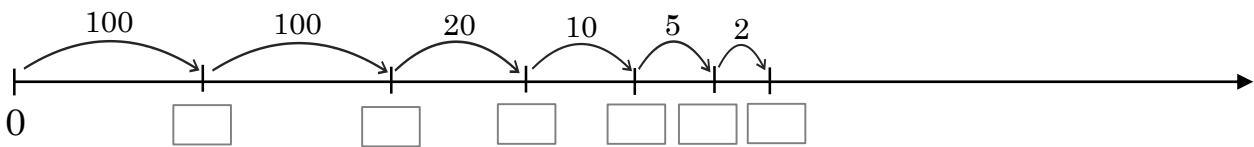
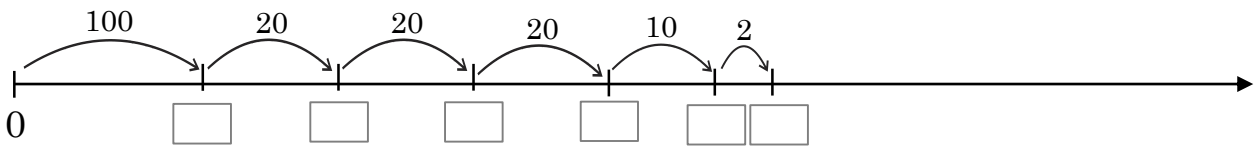
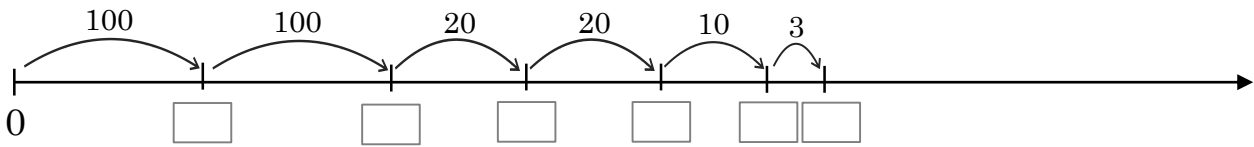
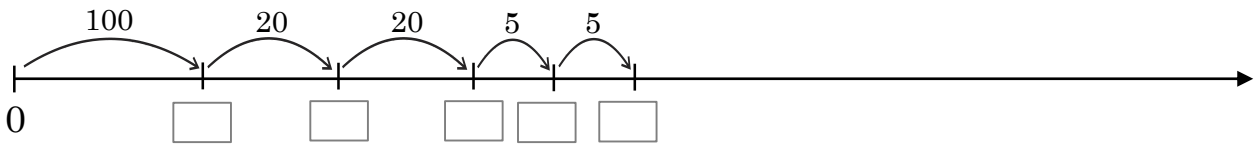
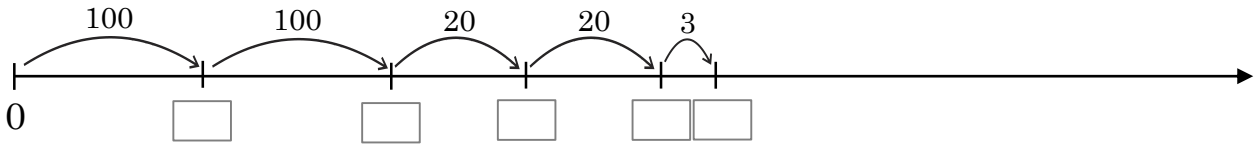
800, 820, , , ,

900, 920, , , ,

Fill in the blanks below:



Fill in the blanks below:



Money – Dollar bills

Count the money for each problem:



\$



\$



\$



\$



\$



\$



\$

Regrouping with the dollar bills:



One bill of \$10 is equal tobills of \$5.

One bill of \$20 is equal tobills of \$5.

One bill of \$20 is equal tobills of \$10.

One bill of \$100 is equal tobills of \$10.

One bill of \$100 is equal tobills of \$20.

Two bills of \$5 make \$.....

Four bills of \$5 make \$.....

Two bills of \$10 make \$.....

Five bills of \$20 make \$.....

Regrouping with dollar bills:

To the Teacher: Perform the following exchange activities with the student:

- (1) Provide student one bill of \$20. Ask to exchange for the bills of \$5.
- (2) Provide student one bill of \$100. Ask to exchange for the bills of \$10.
- (3) Provide student one bill of \$100. Ask to exchange for the bills of \$20.
- (4) Provide student four bills of \$5. Ask to exchange to get back one bills only.
- (5) Provide student two bills of \$10. Ask to exchange to get back one bills only.
- (6) Provide student five bills of \$20. Ask to exchange to get back one bills only.

Making an amount with the least number of bills:

To the Teacher: Ask the student to bring a certain amount of money from the bank with least number of bills. The bank has groups of \$100, \$20, \$10, \$5 and \$1 bills.

Provide a hint to start with the largest possible dollar bill, then proceed to the next smaller bill and so forth ...

Ask to bring the following amounts. Answers are as shown in the brackets.

- | | |
|-----------------------------------------------------|------------------------------------------------------------|
| (1) \$304 [\$100, \$100, \$100, \$1, \$1, \$1, \$1] | (10) \$325 [\$100, \$100, \$100, \$10, \$10, \$5] |
| (2) \$305 [\$100, \$100, \$100, \$5] | (11) \$127 [\$100, \$20, \$5, \$1, \$1] |
| (3) \$307 [\$100, \$100, \$100, \$5, \$1, \$1] | (12) \$430 [\$100, \$100, \$100, \$100, \$20, \$10] |
| (4) \$210 [\$100, \$100, \$10] | (13) \$435 [\$100, \$100, \$100, \$100, \$20, \$10, \$5] |
| (5) \$212 [\$100, \$100, \$10, \$1, \$1] | (14) \$540 [\$100, \$100, \$100, \$100, \$100, \$20, \$20] |
| (6) \$315 [\$100, \$100, \$100, \$10, \$5] | (15) \$242 [\$100, \$100, \$20, \$20, \$1, \$1] |
| (7) \$117 [\$100, \$10, \$5, \$1, \$1] | (16) \$145 [\$100, \$20, \$20, \$5] |
| (8) \$220 [\$100, \$100, \$10, \$10] | (17) \$350 [\$100, \$100, \$20, \$20, \$10] |
| (9) \$222 [\$100, \$100, \$10, \$10, \$1, \$1] | (18) \$260 [\$100, \$100, \$20, \$20, \$20] |

Temperature

Temperature indicates how hot or cold something is.

Temperature is measured in the units of Fahrenheit ($^{\circ}\text{F}$).

Temperature can be measured with a thermostat.

Following are few typical temperatures:

Inside an air-conditioned/heated room: 72°F

Outdoors during summer: 90°F

Outdoors during winter: 40°F

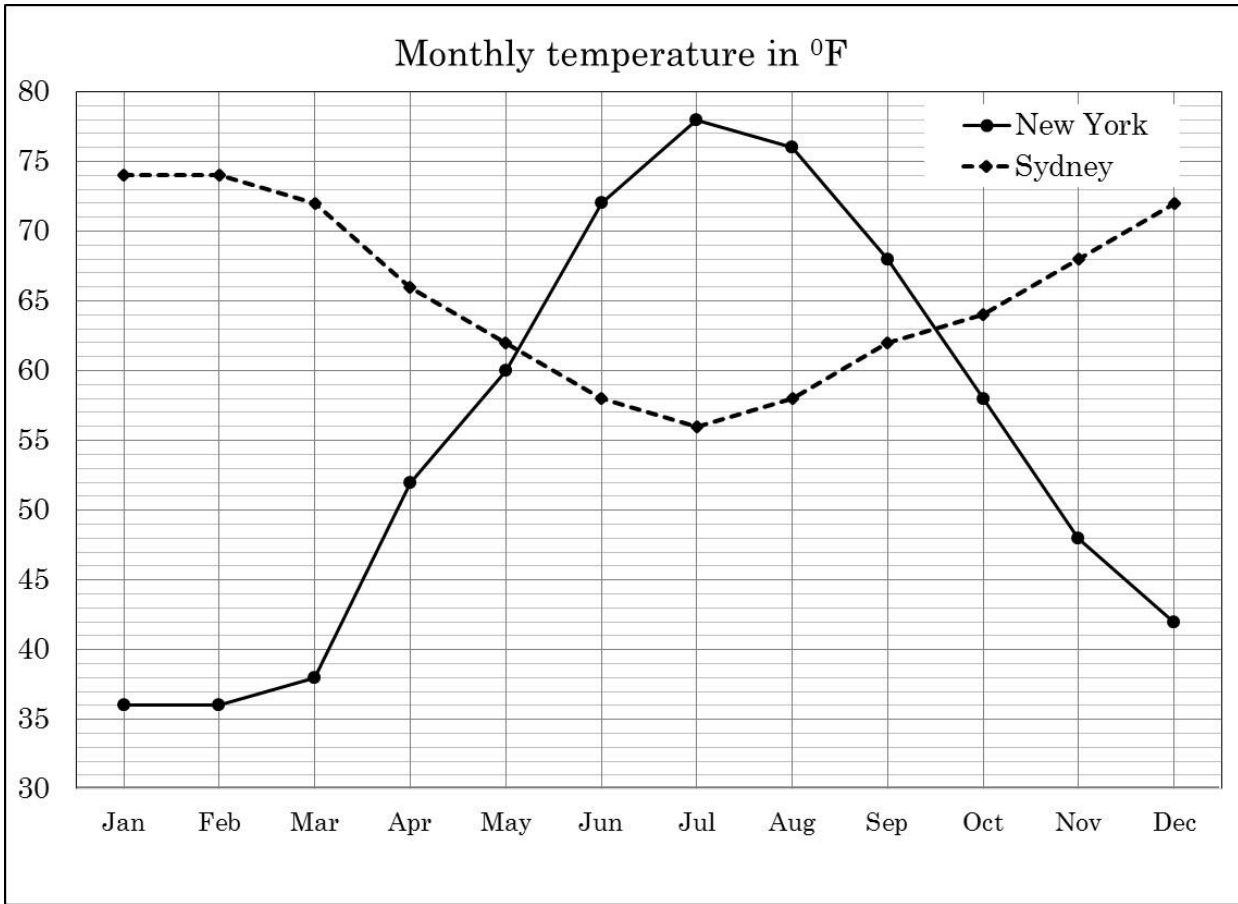
Boiling temperature of water: 212°F

Temperature inside an oven: 450°F

How much cooler is outdoors during winter compared to a heated room? $^{\circ}\text{F}$

How much hotter is outdoors during summer compared to an air-conditioned room? $^{\circ}\text{F}$

How much hotter is the boiling water compared to a typical room?..... $^{\circ}\text{F}$



Fill in the blanks below based on information in the graphs:

During April, temperature in New York is $^{\circ}\text{F}$ while the temperature in Sydney is $^{\circ}\text{F}$.

During October, temperature in New York is $^{\circ}\text{F}$ while the temperature in Sydney is $^{\circ}\text{F}$.

New York has its lowest temperature during the month of
It is $^{\circ}\text{F}$.

Sydney has its lowest temperature during the month of
It is $^{\circ}\text{F}$.

New York has its highest temperature during the month of
It is $^{\circ}\text{F}$.

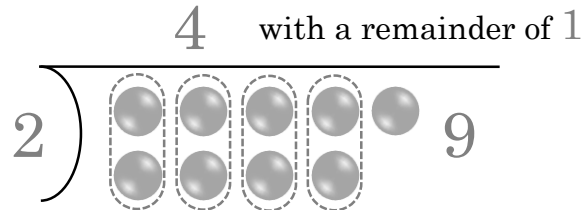
Sydney has its highest temperature during the month of
It is $^{\circ}\text{F}$.

Long Division

Division with a remainder:

$9 \div 2 \rightarrow$

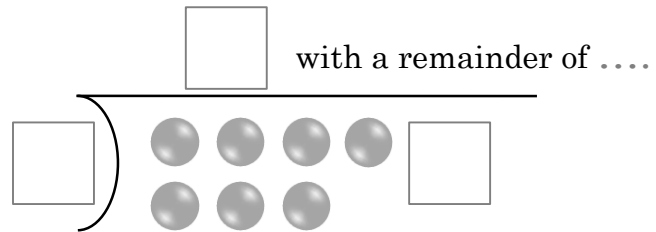
How many 2s go in 9? 4



9 divided by 2 is 4 with a remainder of 1

$7 \div 2 \rightarrow$

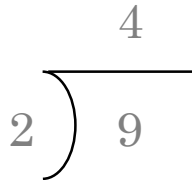
How many 2s go in 7?



.... divided by is with a remainder of

$9 \div 2 \rightarrow$

Step 1:
How many 2s in 9?



Step 2:
Multiply $2 \times 4 = 8$



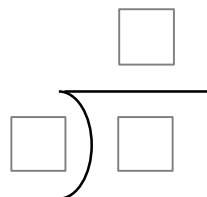
Step 3:
Subtract

1

9 divided by 2 is 4 with
a remainder of 1

$8 \div 3 \rightarrow$

Step 1:
How many 3s in 8?



Step 2:
Multiply



Step 3:
Subtract

□

.... divided by is
with a remainder of

$7 \div 3 \rightarrow$

$$\begin{array}{r} \square \\ \square \overline{) 7} \\ - \square \\ \hline \square \end{array}$$

7 divided by 3 is 2 with
a remainder of 1

$8 \div 3 \rightarrow$

$$\begin{array}{r} \square \\ \square \overline{) \square} \\ - \square \\ \hline \square \end{array}$$

..... divided by is with
a remainder of

$7 \div 2 \rightarrow$

$$\begin{array}{r} \square \\ \square \overline{) \square} \\ - \square \\ \hline \square \end{array}$$

..... divided by is with
a remainder of

$8 \div 2 \rightarrow$

$$\begin{array}{r} \square \\ \square \overline{) \square} \\ - \square \\ \hline \square \end{array}$$

..... divided by is with
a remainder of 0

$5 \div 2 \rightarrow$

..... divided by is with
a remainder of

$9 \div 2 \rightarrow$

..... divided by is with
a remainder of

Numbers till 1,000,000 – Place Values

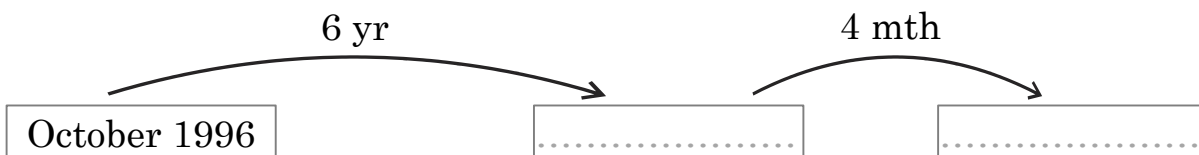
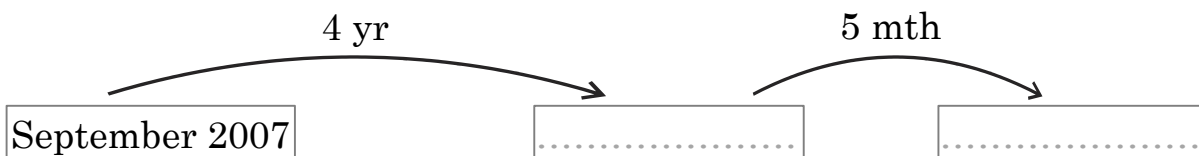
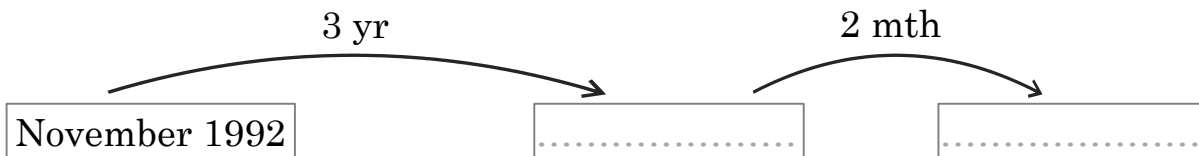
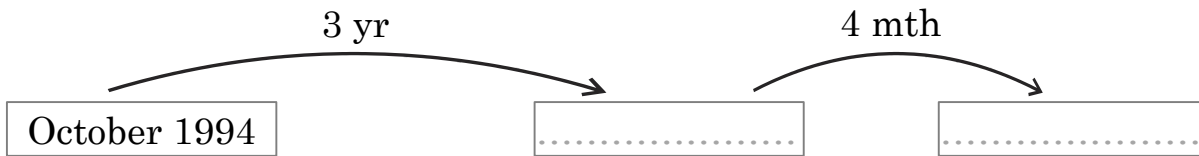
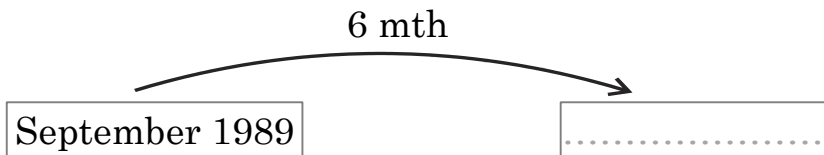
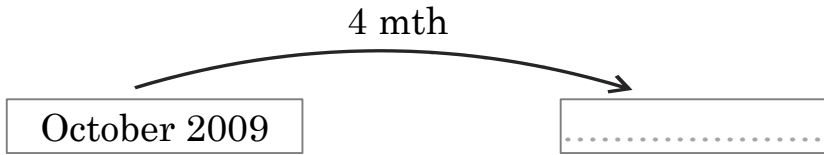
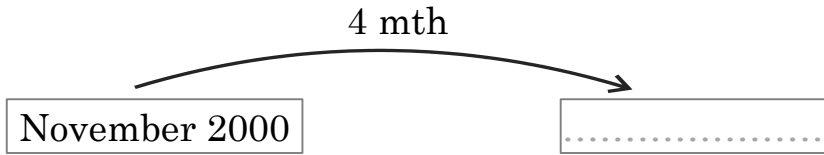
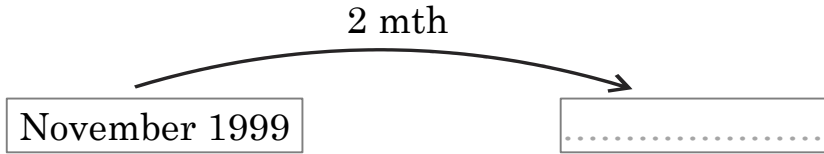
To the Teacher: Please emphasize a comma after thousands

Fill in the blanks:

	Thousands			Hun.	Tens	Ones	
	Hun.	Tens	Ones				
						4	Four
					4	0	Forty
			4	0	0		Four hundred
		4	0	0	0		Four thousand
	4	0	0	0	0		Forty thousand
4	0	0	0	0	0		Four Hundred thousand
	2	0	0	0	0		.....
1	0	0	0	0	0		.....
	5	0	0	0	0		.....
4	0	0	0	0	0		.....
		5	0	0	0		.....
2	0	0	0	0	0		.....
	6	0	0	0	0		.....
8	0	0	0	0	0		.....
		9	0	0	0		.....
9	0	0	0	0	0		.....
	3	0	0	0	0		.....
6	0	0	0	0	0		.....

Write numerals below:

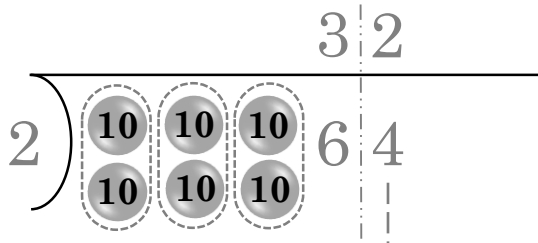
	Thousands			Hun.	Tens	Ones
	Hun.	Tens	Ones	Hun.	Tens	Ones
Three hundred thousand						
Eight thousand						
Forty thousand						
Six hundred thousand						
Eighty thousand						
Seven thousand						
One hundred thousand						
Nine thousand						
Thirty thousand						
Five thousand						
Four hundred thousand						
Ten thousand						
Eight thousand						
Ten thousand						
Nine hundred thousand						
Five thousand						
Ninety thousand						
Two hundred thousand						
Twenty thousand						
Eight hundred thousand						



Long Division

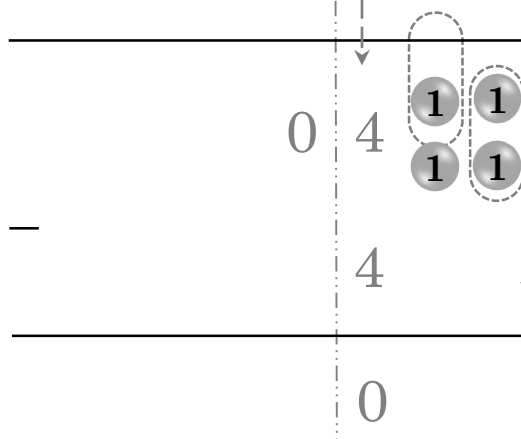
$64 \div 2 \rightarrow$

Step 1:
How many
2s in 6?



Step 2:
Multiply,
 $2 \times 3 = 6$

Step 3:
Subtract



Step 4:
Bring down ones

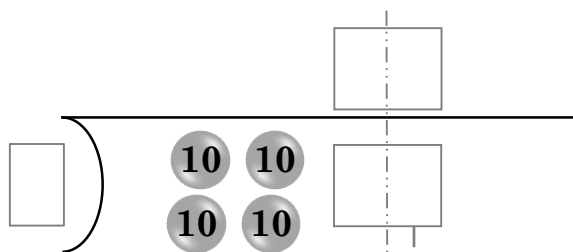
Step 5:
How many 2s in 4?

Step 6:
Multiply,
 $2 \times 2 = 4$

Step 7:
Subtract

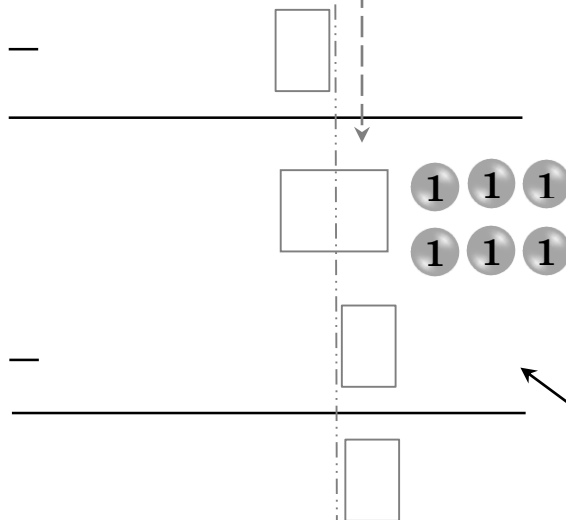
$46 \div 2 \rightarrow$

Step 1:
How many
2s in 4?



Step 2:
Multiply,
... \times ... = ...

Step 3:
Subtract



Step 4:
Bring down ones

Step 5:
How many 2s in 6?

Step 6:
Multiply,
... \times ... = ...

Step 7:
Subtract

$$68 \div 2 \rightarrow$$

Step 1:

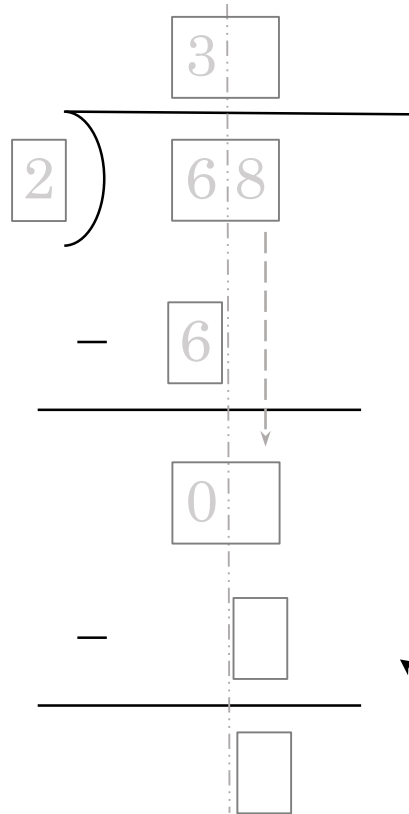
How many
2s in 6?

Step 2:

Multiply,
... \times ... = ...

Step 3:

Subtract



Step 4:

Bring down ones

Step 5:

How many 2s in 8?

Step 6:

Multiply,
... \times ... = ...

Step 7:

Subtract

$$36 \div 3 \rightarrow$$

Step 1:

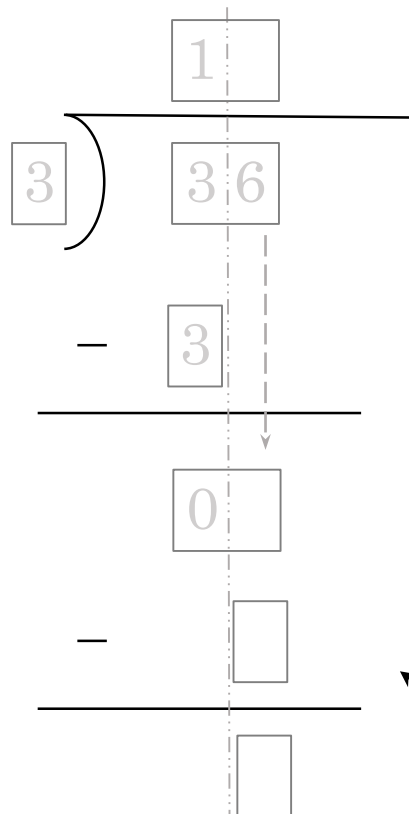
How many
3s in 3?

Step 2:

Multiply,
... \times ... = ...

Step 3:

Subtract



Step 4:

Bring down ones

Step 5:

How many 3s in 6?

Step 6:

Multiply,
... \times ... = ...

Step 7:

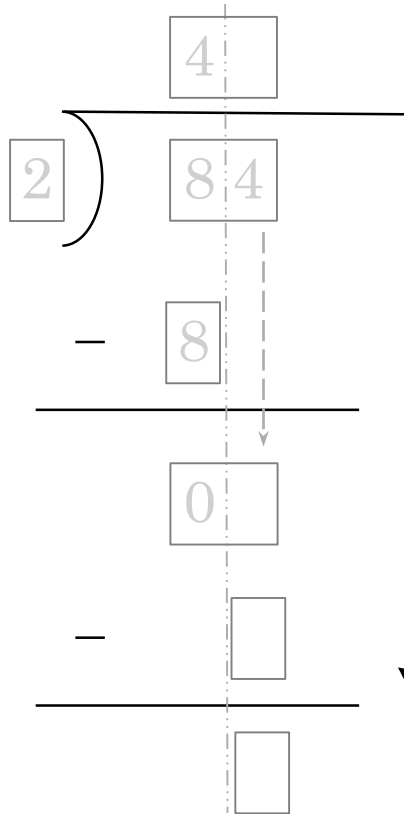
Subtract

$$84 \div 2 \rightarrow$$

Step 1:
How many
2s in 8?

Step 2:
Multiply,
... \times ... = ...

Step 3:
Subtract



Step 4:
Bring down ones

Step 5:
How many 2s in 4?

Step 6:
Multiply,
... \times ... = ...

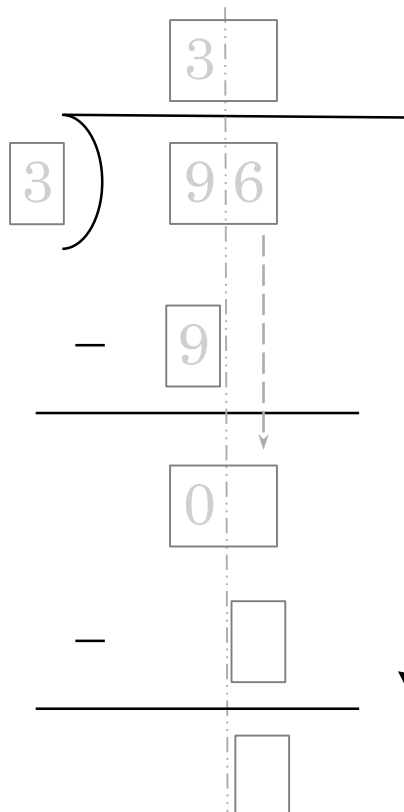
Step 7:
Subtract

$$96 \div 3 \rightarrow$$

Step 1:
How many
3s in 9?

Step 2:
Multiply,
... \times ... = ...

Step 3:
Subtract



Step 4:
Bring down ones

Step 5:
How many 3s in 6?

Step 6:
Multiply,
... \times ... = ...

Step 7:
Subtract

$84 \div 2 \rightarrow$

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<hr/>		
<input)<="" td="" type="text" value="2"/> <td><input type="text" value="84"/></td> <td></td>	<input type="text" value="84"/>	
-	<input type="text" value="8"/>	
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	<input type="text" value="0"/>	
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$64 \div 2 \rightarrow$

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$84 \div 4 \rightarrow$

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$66 \div 3 \rightarrow$

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$86 \div 2 \rightarrow$

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$48 \div 2 \rightarrow$

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Long Multiplication

Perform the long multiplication in two steps:

$$23 \times 4 \Rightarrow$$

Step 1:

Multiply: $4 \times 3 = 12$

Regrouping possible? Yes / No

1	2	3
×		4
		2

Step 2:

Multiply: $4 \times 2 = 8$

Add regrouped number: $8 + 1 = 9$

1	2	3
×		4
9	2	

$$26 \times 3 \Rightarrow$$

Step 1:

Multiply: $3 \times 6 = \dots$

Regrouping possible? Yes / No

	2	6
×		3

Step 2:

Multiply: $3 \times 2 = \dots$

Add regrouped number: $\dots + \dots = \dots$

	2	6
×		3

Perform the following long multiplications in two steps:

$23 \times 4 \Rightarrow$

Step 1:
Multiply to ones
Regroup, if possible

	1	
	2	3
×		4
		2

Step 2:
Multiply to tens
Add regrouped number

	1	
	2	3
×		4
	9	2

$28 \times 3 \Rightarrow$

Step 1:
Multiply to ones
Regroup, if possible

	2	8
×		3

Step 2:
Multiply to tens
Add regrouped number

	2	8
×		3

$36 \times 2 \Rightarrow$

Step 1:
Multiply to ones
Regroup, if possible

	3	6
×		2

Step 2:
Multiply to tens
Add regrouped number

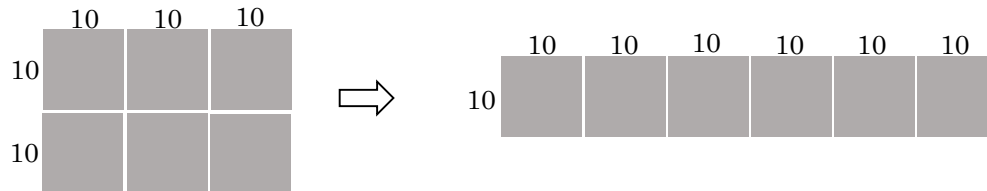
	3	6
×		2

Multiplication with tens

Perform the following multiplications:

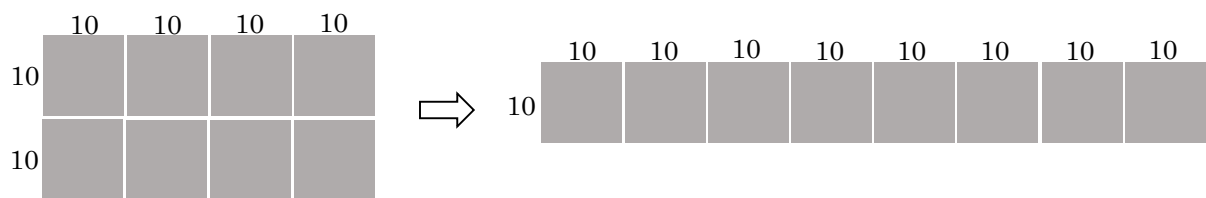
$$3 \times 2 = 6$$

$$30 \times 20 = 600$$



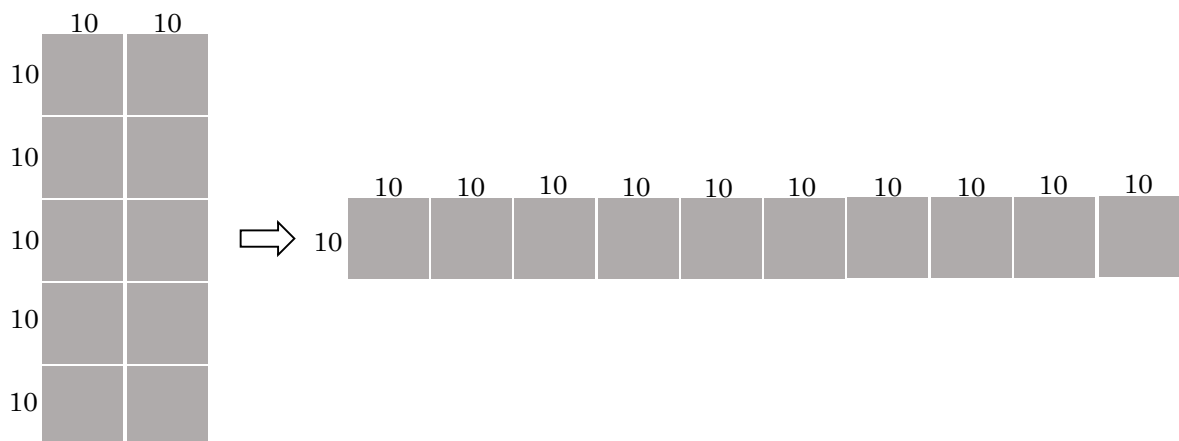
$$4 \times 2 = \dots$$

$$40 \times 20 = \dots$$



$$5 \times 2 = \dots$$

$$50 \times 20 = \dots$$



To the Teacher: For problems on this page, please ask the student to show areas with overlays.

Perform the following multiplications.

Steps: (1) Multiply non-zero digits.

(2) Write total number of zeros to right.

$40 \times 20 = 800$

$50 \times 20 = 1000$

$40 \times 40 = 1600$

$40 \times 50 = 2000$

$3 \times 2 = \dots$

$30 \times 20 = \dots$

$6 \times 3 = \dots$

$60 \times 60 = \dots$

$6 \times 5 = \dots$

$60 \times 50 = \dots$

$8 \times 5 = \dots$

$80 \times 50 = \dots$

$2 \times 5 = \dots$

$20 \times 50 = \dots$

$40 \times 50 = \dots$

$30 \times 20 = \dots$

$20 \times 40 = \dots$

$20 \times 10 = \dots$

$60 \times 70 = \dots$

$20 \times 60 = \dots$

$70 \times 30 = \dots$

$50 \times 40 = \dots$

$30 \times 20 = \dots$

$60 \times 10 = \dots$

$50 \times 30 = \dots$

$70 \times 20 = \dots$

$30 \times 50 = \dots$

$80 \times 80 = \dots$

$50 \times 10 = \dots$

$20 \times 70 = \dots$

$30 \times 40 = \dots$

$30 \times 30 = \dots$

$20 \times 20 = \dots$

$70 \times 80 = \dots$

$60 \times 20 = \dots$

$60 \times 50 = \dots$

$30 \times 60 = \dots$

$50 \times 80 = \dots$

$30 \times 30 = \dots$

$60 \times 40 = \dots$

$90 \times 20 = \dots$

$80 \times 40 = \dots$

$50 \times 60 = \dots$

$60 \times 30 = \dots$

$50 \times 40 = \dots$

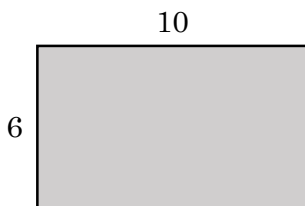
Area and Perimeter

Compute the area and the perimeter of the following figures:



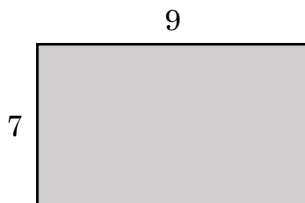
$$\text{Area} = 8 \times 4 = 32 \text{ unit}^2$$

$$\text{Perimeter} = 8 + 8 + 4 + 4 = 24 \text{ unit}$$



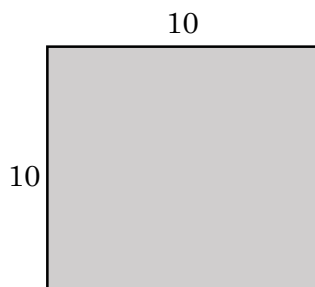
$$\text{Area} =$$

$$\text{Perimeter} =$$



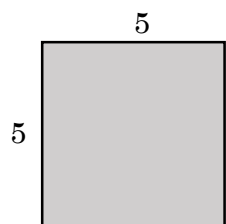
$$\text{Area} =$$

$$\text{Perimeter} =$$



$$\text{Area} =$$

$$\text{Perimeter} =$$



$$\text{Area} =$$

$$\text{Perimeter} =$$

Solve the following word problems:

If baker makes fudge in a pan of size 9 cm x 8 cm, what is the total area and perimeter of this fudge?

If a rectangular garden has a size of 8 units x 6 units, what is its area? How much fence is needed to enclose the garden?

If a rectangular cake has a size of 6 cm x 7 cm, what is its area and the perimeter?

A square shaped garden with the sides of 10 units needs to be enclosed with fence. How much fence will be needed? What is the area of this garden?

Word Problems

Solve the following word problems by filling in the blanks:

Thirty six cents were shared by few children.

Each child received seven cents.

5 children received the money.

1 cent were leftover.

$$\begin{array}{r}
 5 \\
 \hline
 7 \overline{) 36} \\
 \underline{- 35} \\
 1
 \end{array}$$

Eighteen marbles were shared by few children.

Each child received four marbles.

..... children received the marbles.

..... marbles were leftover.

Four children received three marbles each.

Two marbles were leftover.

..... marbles were there altogether.

$$\begin{array}{l}
 \text{Marbles given to} \\
 \text{four children} = 4 \times 3 = 12
 \end{array}$$

$$\text{Total marbles} = 12 + 2 = 14$$

Four children received four toys each.

Two toys were leftover.

..... toys were there altogether.

Seventeen toys were shared by few children.
Each child received five toys.

..... children received the toys.
..... toys were leftover.

Nineteen stickers were shared by few children.
Each child received four stickers.

..... children received the stickers.
..... stickers were leftover.

Four children received five cents each.
Three cents were leftover.
They had cents were altogether.

Twenty toys were shared by few children.
Each child received six toys.

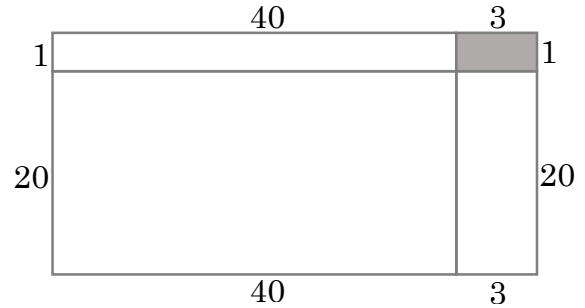
..... children received the toys.
..... toys were leftover.

Long Multiplication

Perform the multiplication 43×21 :

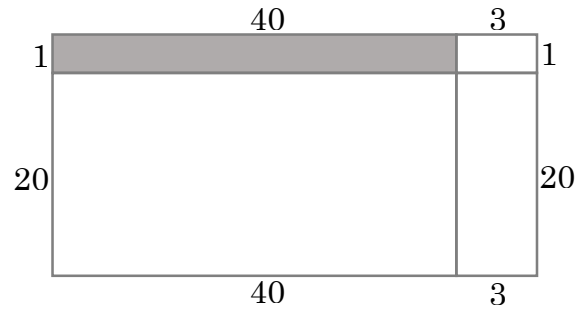
Step 1:
Multiply

$$\begin{array}{r} 43 \\ \times 21 \\ \hline 3 \end{array}$$



Step 2:
Multiply

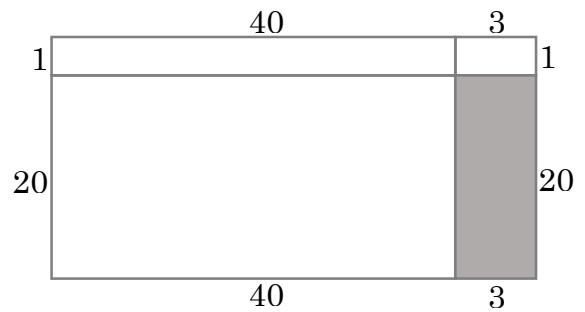
$$\begin{array}{r} 43 \\ \times 21 \\ \hline 43 \end{array}$$



Step 3:
Add zero,
Multiply

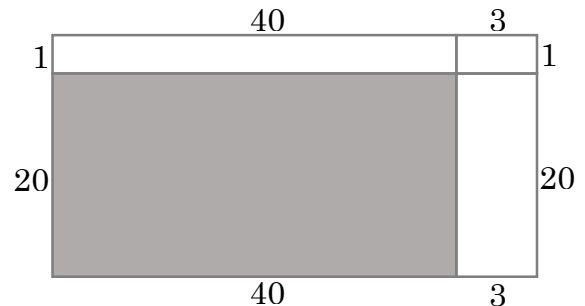
$$\begin{array}{r} 43 \\ \times 21 \\ \hline 43 \\ 60 \end{array}$$

Remember
to write zero



Step 4:
Multiply,
Add

$$\begin{array}{r} 43 \\ \times 21 \\ \hline 43 \\ + 860 \\ \hline 903 \end{array}$$



Perform the following multiplications in three steps:

Step 1: Multiply
by ones

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

Step 2: Write zero,
Multiply by tens

$$\begin{array}{r} \text{2} \text{ 3} \\ \times \text{ 2} \text{ 2} \\ \hline \text{4} \text{ 6} \\ \text{4} \text{ 6} \text{ 0} \leftarrow \text{Write zero} \\ \hline \\ \hline \end{array}$$

Step 3: Add

$$\begin{array}{r} \text{2} \text{ 3} \\ \times \text{ 2} \text{ 2} \\ \hline \text{4} \text{ 6} \leftarrow 23 \times 2 \\ + \text{4} \text{ 6} \text{ 0} \leftarrow 23 \times 20 \\ \hline \text{5} \text{ 0} \text{ 6} \\ \hline \end{array}$$

Step 1: Multiply
by ones

$$\begin{array}{r} \text{3} \text{ 4} \\ \times \text{ 1} \text{ 2} \\ \hline \\ \hline \\ \hline \end{array}$$

Step 2: Write zero,
Multiply by tens

$$\begin{array}{r} \text{3} \text{ 4} \\ \times \text{ 1} \text{ 2} \\ \hline \\ \hline \leftarrow \text{Write zero} \\ \hline \\ \hline \end{array}$$

Step 3: Add

$$\begin{array}{r} \text{3} \text{ 4} \\ \times \text{ 1} \text{ 2} \\ \hline \\ \hline \leftarrow 34 \times 2 \\ + \hline \leftarrow 34 \times 10 \\ \hline \\ \hline \end{array}$$

Step 1: Multiply
by ones

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

Step 2: Write zero,
Multiply by tens

$$\begin{array}{r} \text{2} \text{ 3} \\ \times \text{ 3} \text{ 1} \\ \hline \\ \hline \leftarrow \text{Write zero} \\ \hline \\ \hline \end{array}$$

Step 3: Add

$$\begin{array}{r} \text{2} \text{ 3} \\ \times \text{ 3} \text{ 1} \\ \hline \\ \hline \leftarrow 23 \times 1 \\ + \hline \leftarrow 23 \times 30 \\ \hline \\ \hline \end{array}$$

Step 1: Multiply
by ones

$$\begin{array}{r} \text{3} \text{ 3} \\ \times \text{ 3} \text{ 2} \\ \hline \\ \hline \\ \hline \end{array}$$

Step 2: Write zero,
Multiply by tens

$$\begin{array}{r} \text{3} \text{ 3} \\ \times \text{ 3} \text{ 2} \\ \hline \\ \hline \leftarrow \text{Write zero} \\ \hline \\ \hline \end{array}$$

Step 3: Add

$$\begin{array}{r} \text{3} \text{ 3} \\ \times \text{ 3} \text{ 2} \\ \hline \\ \hline \leftarrow 33 \times 2 \\ + \hline \leftarrow 33 \times 30 \\ \hline \\ \hline \end{array}$$