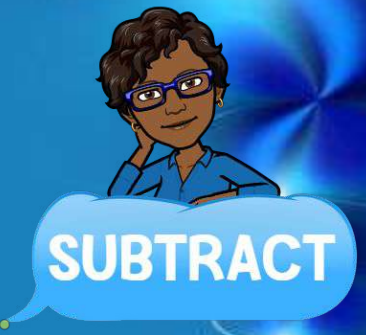
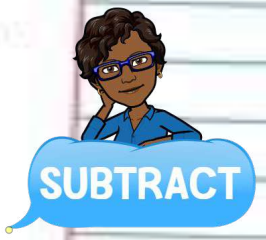
Lesson 2-7



Subtract Across Zeros

BROADUS LEARNINGS



STANDARD:

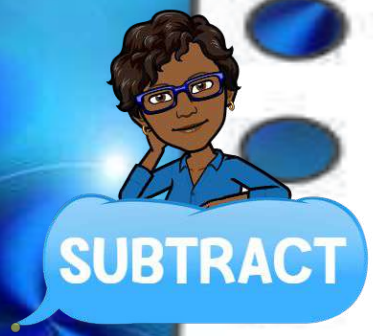
NC.4.NBT.4

Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.

OBJECTIVE:

Today, we will use number sense and regrouping to subtract across zeros.

BROADUS LEARNINGS



I CAN STATEMENT:

I can use the standard algorithm to subtract from numbers with zeros.

ESSENTIAL QUESTION:

How do you subtract across zeros?

BROADUS LEARNINGS

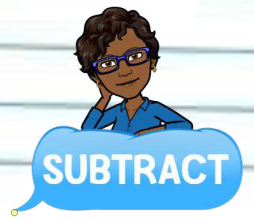
Take notes in your blue notebook when you see the notebook icon.

SUBTRACTING ACROSS ZEROS:

Start with the ones place. Regroup if the minuend (top number), is less than the subtrahend (bottom number)-- Look to your neighbor to the left → Nothing there to regroup? Go to the first neighbor that has something to regroup! Repeat until all neighbors have more than 0.

Line up the digits by places and label them.

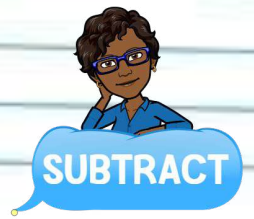
- ➔ Subtract the ones place.
- ➔ Subtract the tens place.
- ➔ Subtract the hundreds place.
- ➔ Subtract the thousands place.
- ➔ Keep going until you have subtracted all places in the problem.



Take notes in your blue notebook when you see the notebook icon.

Inverse operations are opposite operations. The inverse of adding is subtracting.

We will continue to use inverse operations to check our work! In the problems that follow, we will subtract and then use the inverse operation (add) to make sure our answer is accurate.



Take notes in your blue notebook when you see the notebook icon.

SUBTRACT

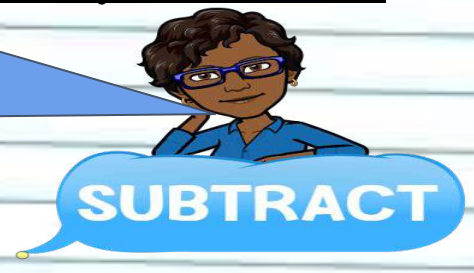
Solve & Share

London, England, is 15,710 kilometers from the South Pole. Tokyo, Japan, is 13,953 kilometers from the South Pole. How much farther is London than Tokyo from the South Pole? *Solve this problem any way you choose.*

BROADUS LEARNINGS

Start with the ones place. We have to regroup because the minuend is less than the subtrahend. Go to the first neighbor that has a digit to regroup!!

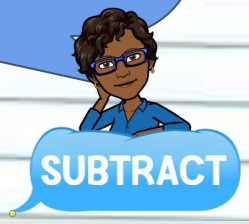
Th	H	T	O
	8	10	
2	~~9~~	0	5
−	2	5	6
			8



Subtract the ones first. Since 8 cannot be subtracted from 5, use regrouping where necessary. To subtract the ones, regroup hundreds to tens.

Regroup: the number 2,905 by regrouping
9 hundreds + 0 tens = 8 hundreds + 10 tens.

Keep regrouping until all neighbors have more than 0!



Th	H	T	O
		9	
	8	~~10~~	15
2,	~~9~~	~~0~~	~~5~~
−	2,	5	6 8

To subtract the ones, we regrouped hundreds to tens and now tens to ones. Now you can complete the subtraction problem.

Regroup: 10 tens + 5 ones = 9 tens and 15 ones.

Now let's subtract the ones place.

Th	H	T	O
		9	
	8	~~10~~	15
2	~~9~~	~~0~~	~~5~~
−	2	5	6
			7

15 ones - 8 ones = 7 ones.

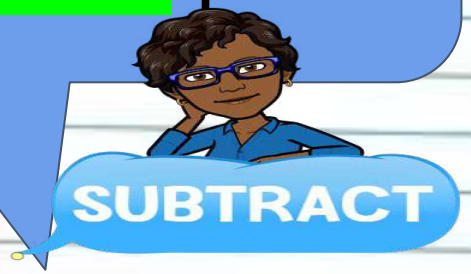
BROADUS LEARNINGS

Now let's subtract the tens place.

Th	H	T	O
		9	
	8	10	15
2	~~9~~	~~0~~	~~5~~
- 2	5	6	8
		3	7

9 tens - 6 tens = 3 tens

Now let's subtract the hundreds place.



	Th	H	T	O
			9	
		8	10	15
	2	~~9~~	~~0~~	~~5~~
−	2	5	6	8
		3	3	7

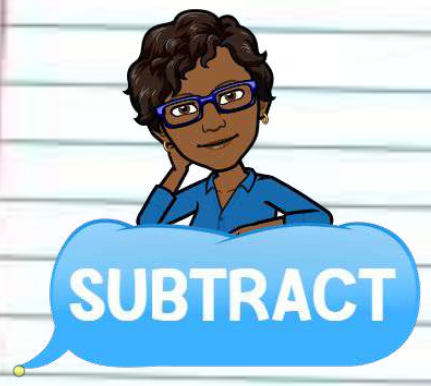
9 hundreds - 6 hundreds = 3 hundreds

Now let's subtract the thousands place.

Th	H	T	O
		9	
	8	10	15
2	~~9~~	~~0~~	~~5~~
− 2	5	6	8
0	3	3	7

9 thousands - 6 thousands = 3 thousands

Subtract, then use the inverse operation to check your work.
Estimate to check if your answers are reasonable.



	Th	H	T	O
			7	17
	4	,	3	8 7
−	3	,	3	5 9
	1	,	0	2 8

1. Subtract the thousands place. Regroup if needed.

4 thousands - 3 thousands = 0 thousands

No regrouping needed because the minuend is greater than the subtrahend.

Tth	Th	H	T	O
	5	10		
7	6	,	0	0
- 5	7	,	3	7

Start with the ones place. We have to regroup because the minuend is less than the subtrahend. Go to the first neighbor that has a digit to regroup!!

Subtract the ones first. Since cannot subtracted 7 from 0, use regrouping where necessary. To subtract the ones, regroup thousands to hundreds.

Regroup: the number 76,000 by regrouping
6 thousands + 10 hundreds = 5 thousands + 10 hundreds

Keep regrouping until all neighbors have more than 0!

Tth	Th	H	T	O
		9		
	5	~~1~~0	10	
7	~~6~~	,	~~0~~	~~0~~ 0
- 5	7	,	3	3 7

Since cannot be subtracted from , use regrouping where necessary. To subtract the ones, regroup hundreds to tens.

Regroup: 10 hundreds + 0 tens = 9 hundreds + 10 tens.

Keep regrouping until all neighbors have more than 0!

Tth	Th	H	T	O
		9	9	
	5	1̸0	1̸0	10
	7	6̸	,0̸0̸	0̸
−	5	7	, 3	3 7

Since cannot be subtracted from , use regrouping where necessary. To subtract the ones, regroup tens to ones.

Regroup: 10 tens + 0 ones = 9 tens + 10 ones

BROADUS LEARNINGS

Now let's subtract the ones place.

Tth	Th	H	T	O
		9	9	
	5	~~10~~	~~10~~	10
7	~~6~~	,	0	0
- 5	7	,	3	3
				3

10 ones - 7 ones = 3 ones.

BROADUS LEARNINGS

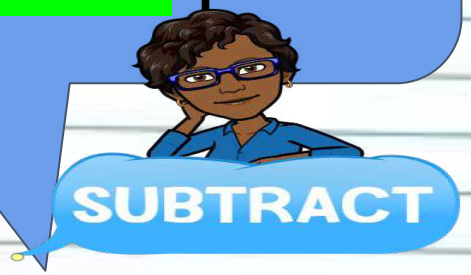
Now let's subtract the tens place.

Tth	Th	H	T	O
		9	9	
	5	10	10	10
7	6	,	0	0	0
- 5	7	,	3	3	7
			6	3

9 tens - 3 tens = 6 tens.

BROADUS LEARNINGS

Now let's subtract the hundreds place.



Tth	Th	H	T	O
		9	9	
	5	10	10	10
7	6	0	0	0
- 5	7	3	3	7
		6	6	3

9 hundreds - 3 hundreds = 6 hundreds.

Now let's subtract the **thousands** place.

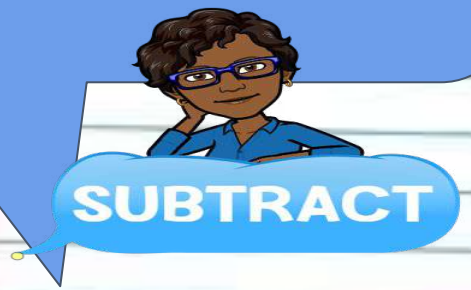
Tth	Th	H	T	O
		9	9	
6	15	10	10	10
~~7~~	~~6~~	~~,~~	~~0~~	~~0~~ ~~0~~
- 5	7	,	3	3 7
8	,	6	6	3

Regroup: 7 ten thousands + 5 thousands = 6 ten thousands + 15 thousands

15 thousands -7 thousands = 8 thousands

BROADUS LEARNINGS

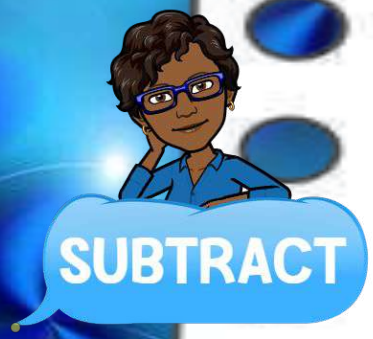
Now let's subtract the ten thousands place.

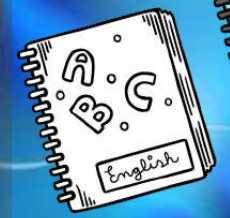


Tth	Th	H	T	O
		9	9	
	15			
6	~~5~~	~~10~~	~~10~~	10
~~7~~	~~6~~	,~~0~~	~~0~~	~~0~~
- 5	7	, 3	3	7
1	8	,6	6	3

6 ten thousands - 5 ten thousands = 1 ten thousand

NEW STRATEGY ALERT:





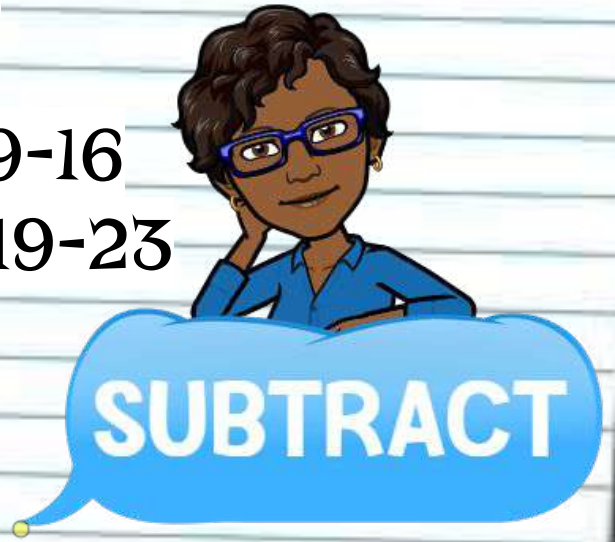
BROADUS LEARNINGS

INDEPENDENT PRACTICE:

p 63 Problems 18
p 64 Problems 27, 28

HOMEWORK:

Monday: p 63 9-16
Tuesday: p 63 17, 19-23



BROADUS LEARNINGS

Another strategy, when subtracting from numbers like 2,000 is to take one away from 2,000 to make it 1,999. Subtract 1,999 – 1,876. Now you don't have to borrow!!

Because we took one away (subtracted) from 2,000 we have to give it back (add it) at the end to get our final answer.

$$\begin{array}{r} 1,999 \\ -\ 1,876 \\ \hline 123 \end{array}$$

We took one away from 2,000, so we have to give it back (add it) to find the answer. 123 + 1 = **124**

You try! 5,000 – 1,634

Discuss strategies. Answers on next slide

$$\begin{array}{r} 5{,}000 \\ -1{,}634 \\ \hline \end{array}$$

OR

$$\begin{array}{r} 4{,}999 \\ -1{,}634 \\ \hline \end{array}$$

We took one away. Don't forget to give it back!

5,000 - 1,634

$$\begin{array}{r} 5{,}000 \\ -1{,}634 \\ \hline 3{,}366 \end{array}$$

OR

$$\begin{array}{r} 4{,}999 \\ -1{,}634 \\ \hline 3{,}365 \\ 3{,}366 \end{array} +1$$

We took one away. Don't forget to give it back!

Solve

5,700 - 734

(answer on next slide)

5,700 - 734

$$\begin{array}{r} {\scriptstyle 4}\quad{\scriptstyle 6}\quad{\scriptstyle 9}\quad{\scriptstyle 10} \\ 5,\not{7}\not{0}\not{0} \\ -\ 734 \\ \hline 4,966 \end{array}$$

OR

$$\begin{array}{r} {\scriptstyle 4}\quad{\scriptstyle 16} \\ 5,\not{6}99 \\ -\ 734 \\ \hline 4,965 \end{array}$$

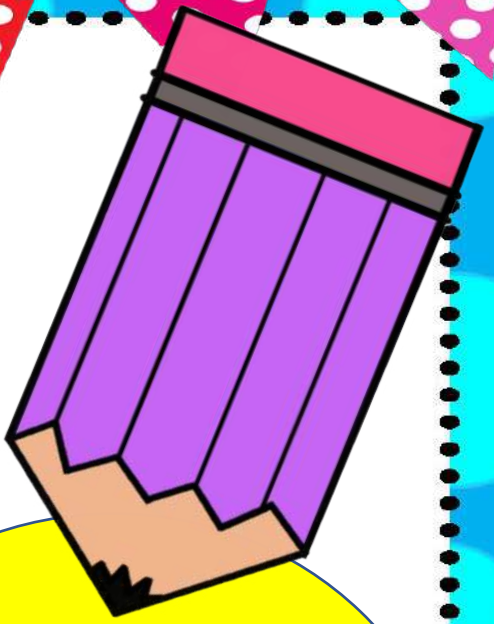
4,965 + 1 = 4966

You still might have to borrow, but not as much. We took one away. Don't forget to give it back!

Solve!

5,001 – 1,856

(answer on next slide)



Try subtracting 2 to make it 4,999!

5,001 - 1,856 = 3,145

Subtracting 2 made it a LOT easier!

4,999 - 1,856 = 3,143 because we took <u>two away</u> to make subtraction easier, we must give the two back (add 2) in our answer.

3,143 + 2 = 3,145

Solve!

406 - 164

(answer on next slide)

Answer

242

62,500 people attended the Chicago Bears football game and 41,876 people attended the Sox baseball game. How many more people attended the football game than the baseball game?

Answer on next slide.

62,500 people attended the Chicago Bears football game and 41,876 people attended the Sox baseball game. How many more people attended the football game than the baseball game?

Notice, you may still need to borrow when you adjust a number.

1

20,624

1 14

62,499

- 41,876

20,623

Add one back

+1 = 20,624

Last Question: Josh scored 12,399 points on a pinball game. His sister Janice scored 8,980 points. How many more points did he score than his sister?

Answer on next slide.

$$\begin{array}{r} {\scriptstyle 1} \\ 12{,}399 \\ 8{,}980 \\ \hline 3{,}419 \end{array}$$

Josh scored 3,419 more points than his sister.