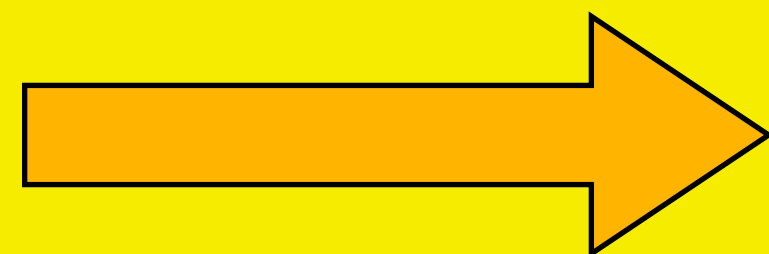


Choosing Methods

Learning Objective:

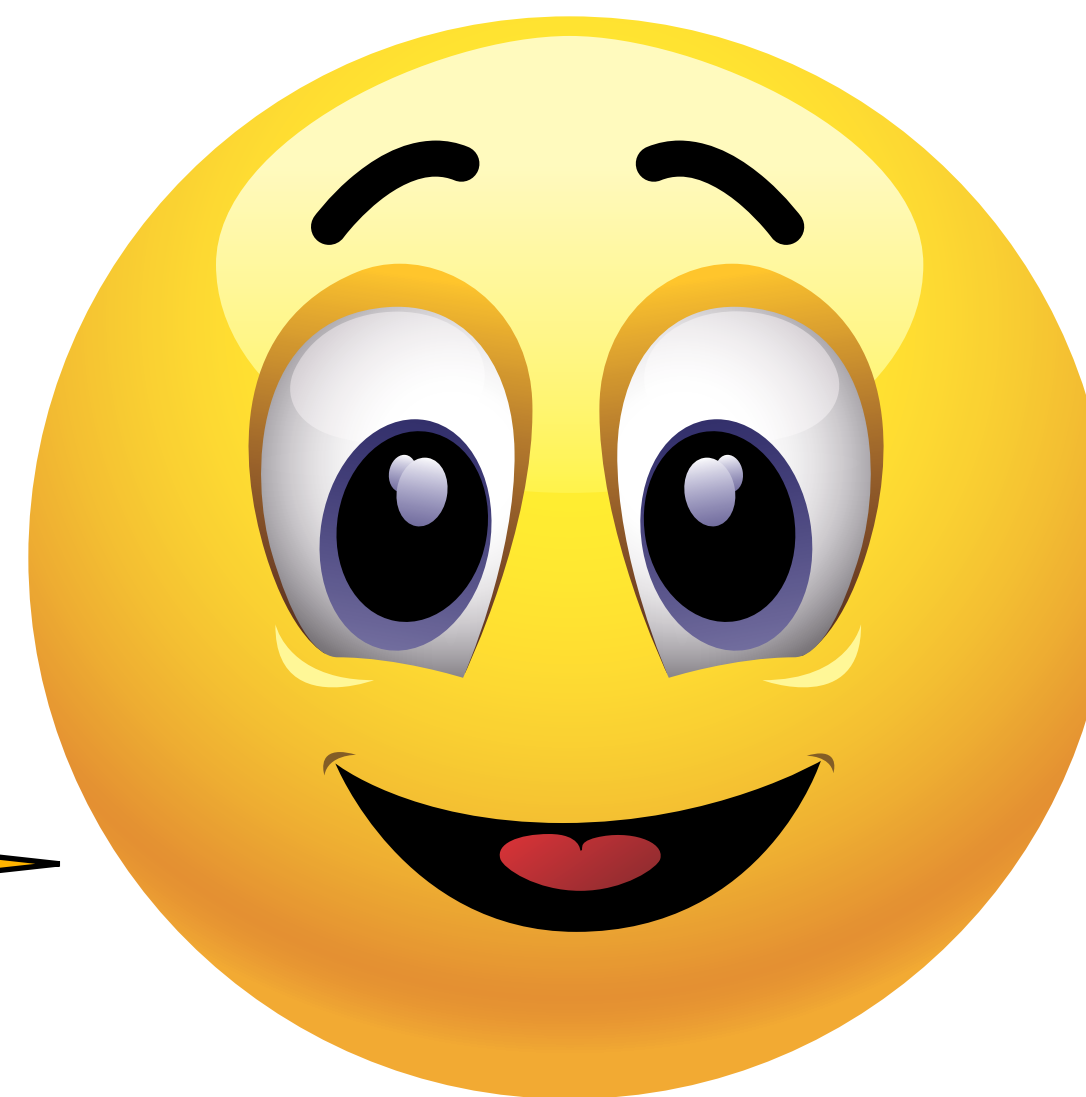
To be able to choose a method for solving addition and subtraction problems, including mental methods.



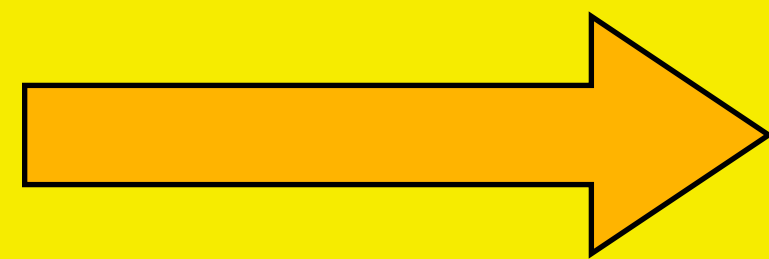
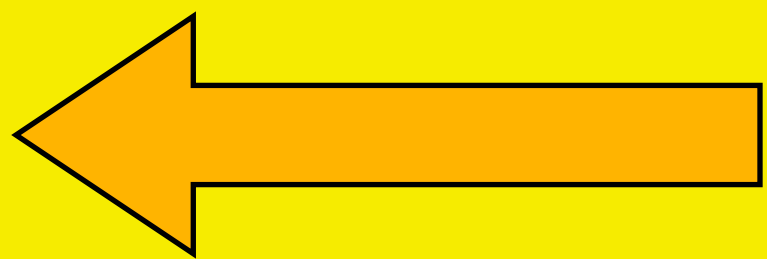


Have a look at the addition problem on the next slide.

How many different methods could you use to solve it? What are they?



$$15,470 + 3,991$$



Can you use expanded column addition?

Can you do it mentally?

$$15,470 + 3,991$$

Can you use vertical column addition?

What would be the best method to use to solve this calculation?

Can you use rounding and adjustment?



$$15,470 + 3,991 = 19,461$$

Did you use the vertical column method? Why?



	1	5	4	7	0	
	+	3	9	9	1	
	1	9	4	6	1	
		1	1			

Can you use expanded column addition?

Can you do it mentally?

$$291,364 + 7,899$$

Can you use vertical column addition?

What would be the best method to use to solve this calculation?

Can you use rounding and adjustment?



$$291,364 + 7,899 = 299,263$$

Did you use the
adjustment method?
Why?

$$\begin{aligned} &291,364 + 7,899 \\ &= 291,364 + (7,899 + 100 + 1) - 100 - 1 \\ &= 291,364 + (7,999 + 1) - 100 - 1 \\ &= 291,364 + 8,000 - 100 - 1 \\ &= 299,364 - 100 - 1 \\ &= 299,264 - 1 \\ &= 299,263 \end{aligned}$$

I added 101 to make
8,000 so I also need
to remember to take
it away!



Which methods would you use to solve each of these number sentences? Why?

$$53,000 + 40,200$$

$$37,960 + 21,476$$

$$8,459 + 90,623$$

$$802,506 + 4,999$$

$$793,145 + 68,523$$

$$6,500 + 210,300$$

Column addition?

Mentally?

Rounding and adjustment?



Can you solve any of these number sentences using the suggested methods?

$$53,000 + 40,200$$

$$37,960 + 21,476$$

$$8,459 + 90,623$$

$$802,506 + 4,999$$

$$793,145 + 68,523$$

$$6,500 + 210,300$$

Column addition

Mentally

Rounding and adjustment



Did you get the correct answers? Click on each method if you want to see how the problems were solved!

Mentally

$$53,000 + 40,200 = 93,200$$

$$6,500 + 210,300 = 216,800$$

Rounding
and adjustment

$$37,960 + 21,476 = 59,436$$

$$802,506 + 4,999 = 807,505$$

Column addition

$$793,145 + 68,523 = 861,668$$

$$8,459 + 90,623 = 99,082$$

Mentally

$$53,000 + 40,200 = 93,200$$

$$6,500 + 210,300 = 216,800$$



These addition problems do not involve bridging. They can be solved using mental methods.

Rounding
and adjustment

$$37,960 + 21,476 = 59,436$$

$$802,506 + 4,999 = 807,505$$

$$\begin{aligned} &37,960 + 21,476 \\ &= (37,960 + 40) + 21,476 - 40 \\ &= 38,000 + 21,476 - 40 \\ &= 59,476 - 40 \\ &= 59,436 \end{aligned}$$



Adding 40 to the first number in this addition problem makes it much easier to solve.

$$\begin{aligned} &802,506 + 4,999 \\ &= 802,506 + (4,999 + 1) - 1 \\ &= 802,506 + 5,000 - 1 \\ &= 807,506 - 1 \\ &= 807,505 \end{aligned}$$



Adding one to the first number in this addition problem makes it much easier to solve.

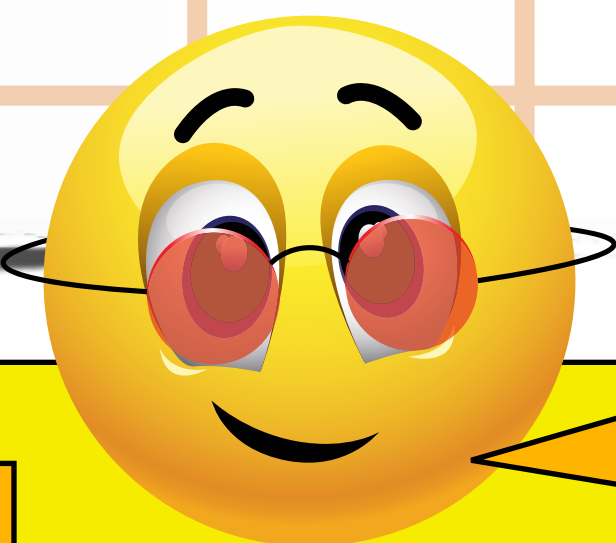
Column addition

$$793,145 + 68,523 = 861,668$$

$$8,459 + 90,623 = 99,082$$

7	9	3	1	4	5
+	6	8	5	2	3
<hr/>					
8	6	1	6	6	8
<hr/>					
1	1				

	9	0	6	2	3
	+	8	4	5	9
<hr/>					
	9	9	0	8	2
<hr/>					
		1		1	

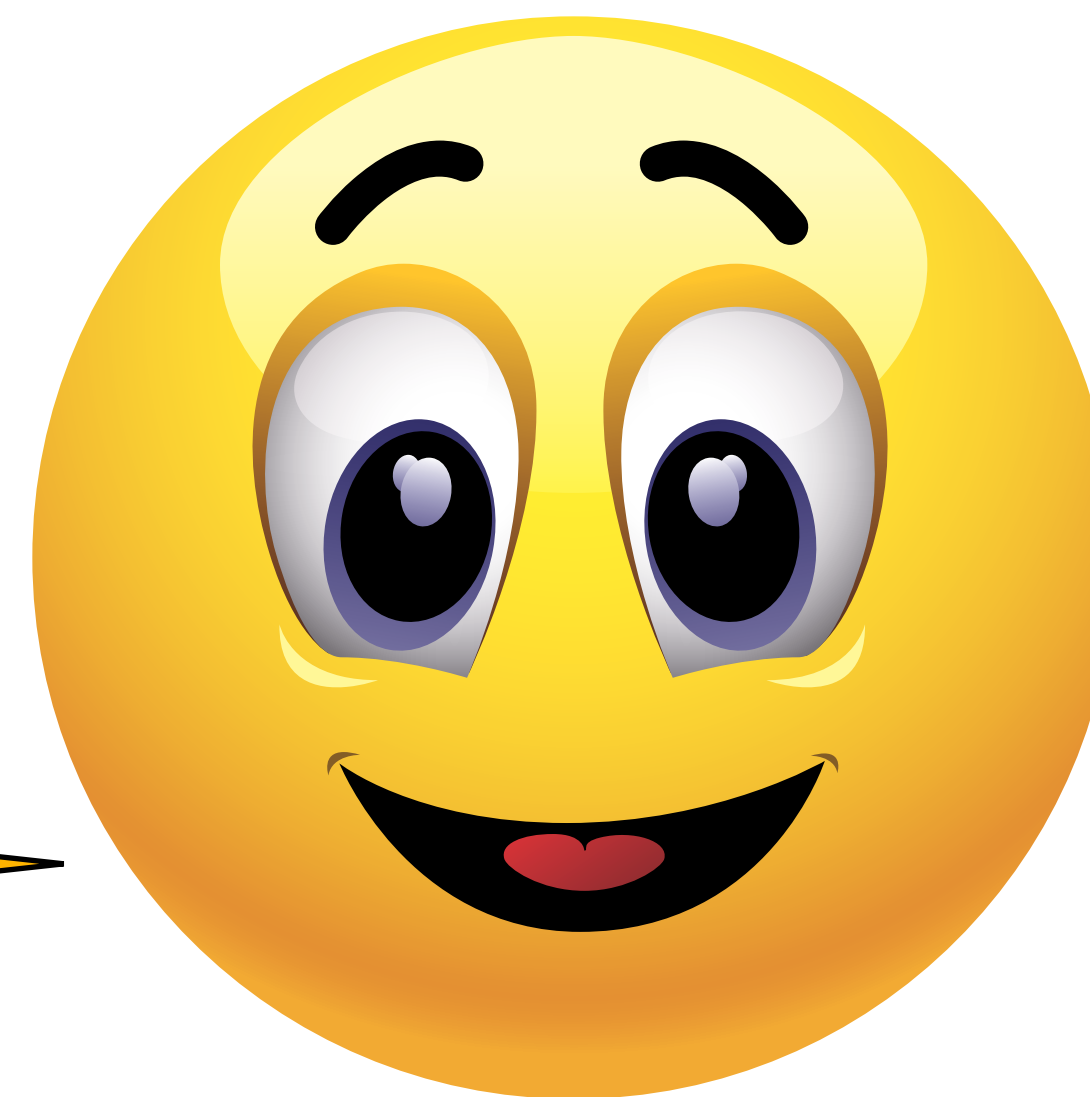


Both of these addition problems involve bridging and carrying numbers. Using the column method means you are less likely to make a mistake.



Have a look at the subtraction problem on the next slide.

How many different methods could you use to solve it? What are they?



Can you use expanded column subtraction?

Can you do it mentally?

$$60,485 - 3,248$$

Can you use vertical column subtraction?

What would be the best method to use to solve this calculation?

Can you use equals addition?



$$60,485 - 3,248 = 57,237$$

Did you use the vertical column method? Why?



	5	1		7	1	
	6	0	4	8	5	
	-	3	2	4	8	
	5	7	2	3	7	

Can you use expanded column subtraction?

Can you do it mentally?

$$319,457 - 6,989$$

Can you use vertical column subtraction?

What would be the best method to use to solve this calculation?

Can you use equals addition?

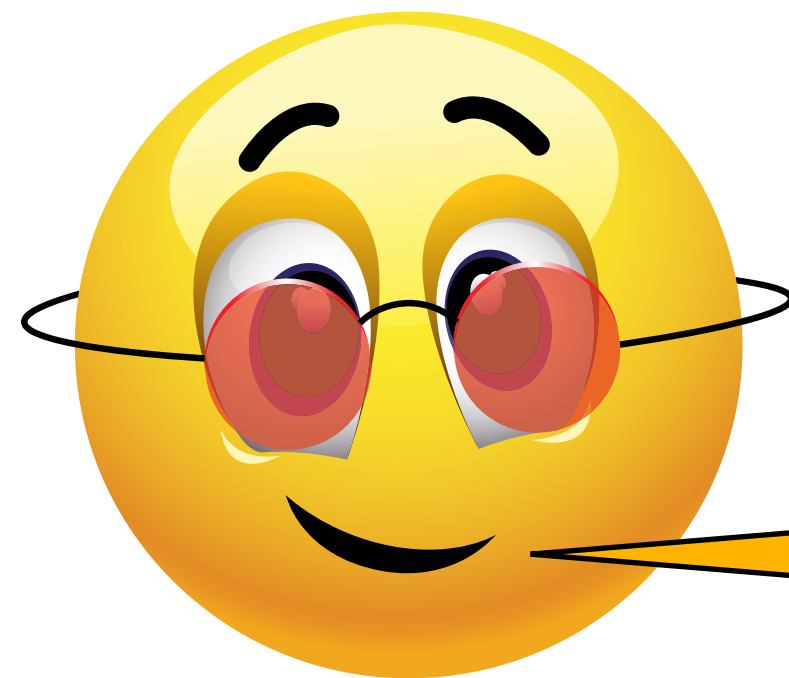


$$319,457 - 6,989 = 312,468$$

Did you use the equals addition method? Why?



$$\begin{aligned} &319,457 - 6,989 \\ &= (319,457 + 11) - (6,989 + 11) \\ &= 319,468 - 7,000 \\ &= 312,468 \end{aligned}$$



I added 11 to 6,989 to make 7,000. To ensure I got the right answer I also needed to add 11 to 319,457!



Which methods would you use to solve each of these number sentences? Why?

$$69,543 - 4,998$$

$$85,631 - 41,000$$

$$84,673 - 2,668$$

$$607,200 - 200,200$$

$$567,284 - 371,162$$

$$348,647 - 2,996$$

Column subtraction?

Mentally?

Equals addition?



Can you solve any of these number sentences using the suggested methods?

$$69,543 - 4,998$$

$$85,631 - 41,000$$

$$84,673 - 2,668$$

$$607,200 - 200,200$$

$$567,284 - 371,162$$

$$348,647 - 2,996$$

Column subtraction

Mentally

Equals addition



Did you get the correct answers? Click on each method if you want to see how the problems were solved!

Mentally

$$607,200 - 200,200 = 407,000$$

$$85,631 - 41,000 = 44,631$$

Equals addition

$$69,543 - 4,998 = 64,545$$

$$348,647 - 2,996 = 345,651$$

Column addition

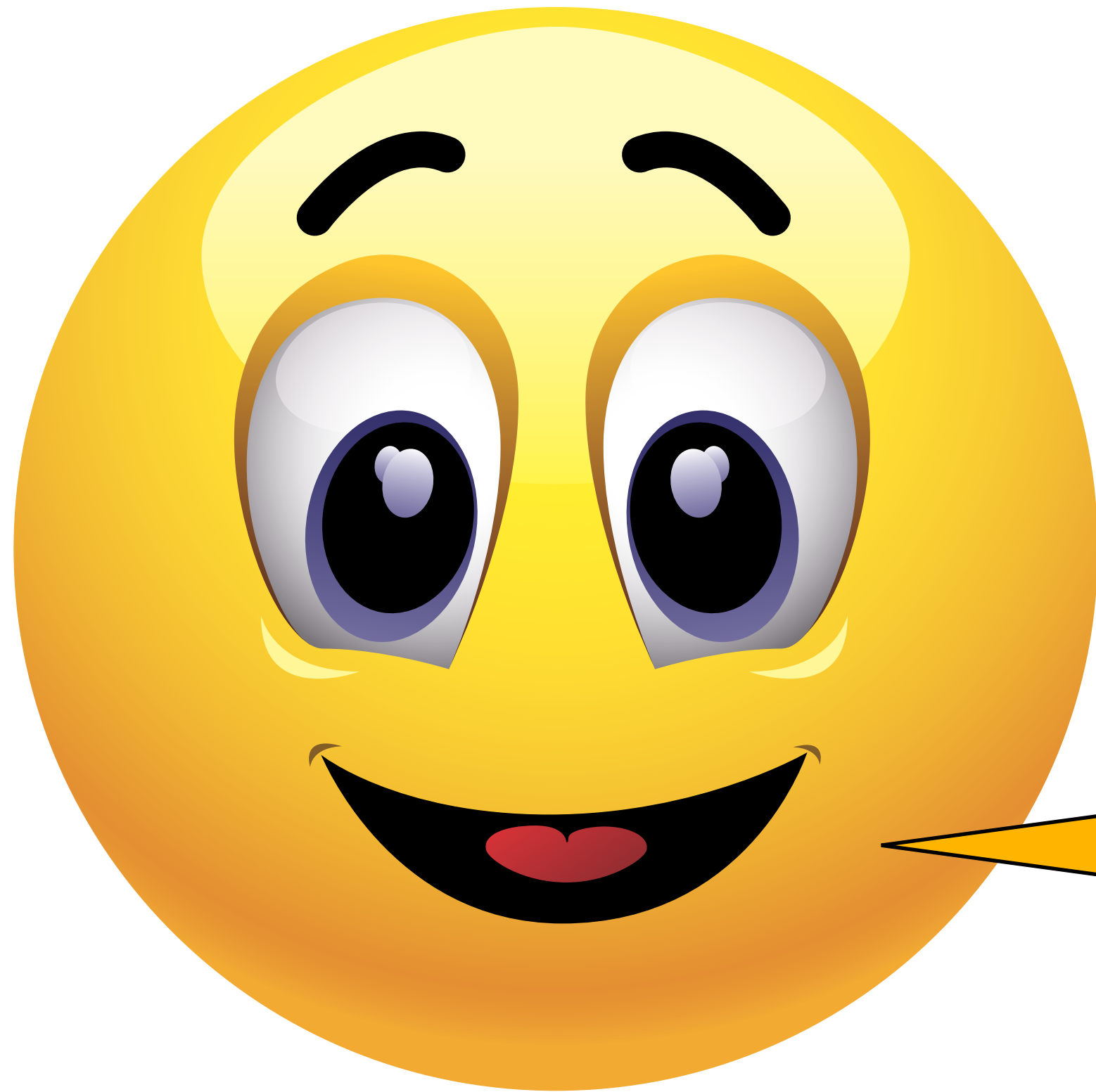
$$567,284 - 371,162 = 196,122$$

$$84,673 - 2,668 = 82,005$$

Mentally

$$607,200 - 200,200 = 407,000$$

$$85,631 - 41,000 = 44,631$$



These subtraction problems do not involve exchanging. They can be solved using mental methods.

Equals addition

$$69,543 - 4,998 = 64,545$$

$$348,647 - 2,996 = 345,651$$

$$\begin{aligned} &69,543 - 4,998 \\ &= (69,543 + 2) - (4,998 + 2) \\ &= 69,545 - 5,000 \\ &= 64,545 \end{aligned}$$

$$\begin{aligned} &348,647 - 2,996 \\ &= (348,647 + 4) - (2,996 + 4) \\ &= 348,651 - 3,000 \\ &= 345,651 \end{aligned}$$



Adding two to both numbers in this subtraction problem makes it much easier to solve.



Adding four to both numbers in this subtraction problem makes it much easier to solve.

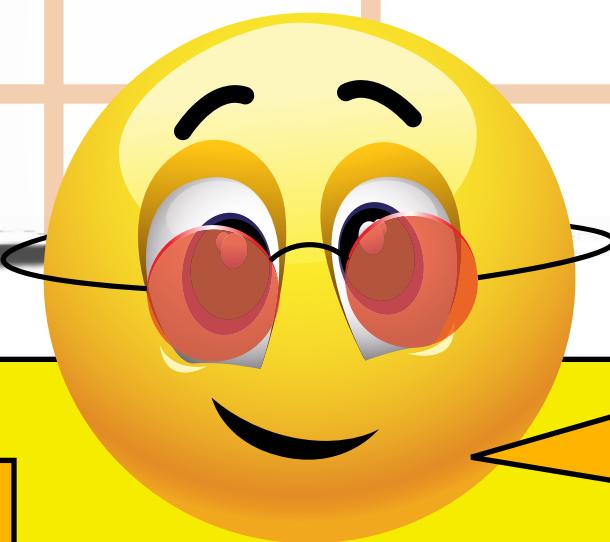
Column addition

$$567,284 - 371,162 = 196,122$$

$$84,673 - 2,668 = 82,005$$

	⁴	¹				
	5	6	7	2	8	4
-	3	7	1	1	6	2
<hr/>						
	1	9	6	1	2	2
<hr/>						

				⁶	¹	
	8	4	6	7	3	
-	2	6	6	8		
<hr/>						
	8	2	0	0	5	
<hr/>						



Both of these subtraction problems involve exchanging numbers. Using the column method means you are less likely to make a mistake.

Plenary:

Challenge!

How could you add up all the whole numbers from 1 to 100?

$$1 + 2 + 3 + 4 + 5 \dots 97 + 98 + 99 + 100 =$$

How long do you think this would take you?

Is there a method you could use to help you?

One day, a boy called Karl Gauss and his class were given this problem by their teacher. The teacher hoped it would take them a while to work so that he could have a snooze at the back of the class. However, before the rest of the class had even written out the question, Gauss had solved it.



The answer is 5,050 Sir!

He was right! His teacher was amazed and asked him how he worked it out.

Here is how Gauss arrived at his answer so quickly. He noticed that in the series of numbers $1 + 2 + 3 + 4 \dots 97 + 98 + 99 + 100$, the sum of pairs of numbers from each end, and working in toward the middle, all came to the same value: 101.

In other words, $1 + 100, 2 + 99, 3 + 98, 4 + 97$, etc.
all equal 101.

Since there are fifty pairs of these numbers in the series 1 to 100, Gauss reasoned that the sum of all the numbers would be 50 times 101 or 5,050.

Karl Gauss (1777-1855)



Karl Gauss went on to become one of the most famous mathematicians of all time.

Did you work out the answer like I did?! If so, maybe you will become a famous mathematician too!