INCLUSION IN TEXAS

Instructional Routines for Mathematics Intervention

The purpose of these mathematics instructional routines is to provide educators with materials to use when providing intervention to students who experience difficulty with mathematics. The routines address content included in the grades 2-8 Texas Essential Knowledge and Skills (TEKS). There are 23 modules that include routines and examples – each focused on different mathematical content. Each of the 23 modules include vocabulary cards and problem sets to use during instruction. These materials are intended to be implemented explicitly with the aim of improving mathematics outcomes for students.

TEA
Texas Education Agency

Instructional Routines for Mathematics Intervention

MODULE 4

Concepts of Additions

Module 4: Concepts of Addition
Mathematics Routines

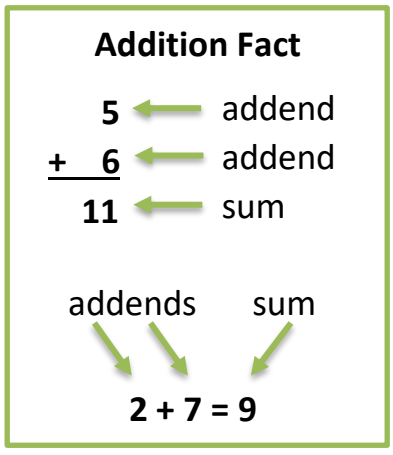
A. Important Vocabulary with Definitions

Term	Definition
add/addition	To put amounts together to find the sum or to increase a set.
addend	Any numbers that are added together.
equal sign	The symbol that tells you that two sides of an equation are the same, balanced, or equal.
join	To add to an existing set.
plus sign	The symbol that tells you to add.
sum	The result of adding two or more numbers or the total number when you combine sets.
together	To combine sets or numbers.

B. Background Information

Students need to learn two concepts of addition: (1) addition as combining and (2) addition as joining to a set. Typically, students first learn about adding as combining parts together. Then, students learn about adding as joining to a set.

For learning the concepts of addition, we recommend using *mathematics facts*. We define an addition mathematics fact as single-digit addends added for a single- or double-digit sum. You may present addition facts vertically or horizontally.



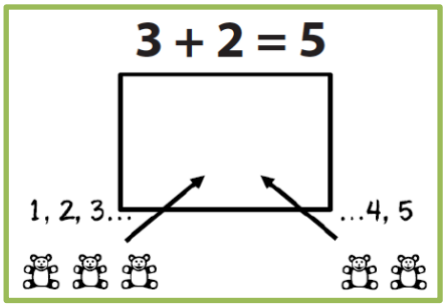
C. Routines and Examples

(1) Addition as Combining

Routine

Materials:

- Module 4 Addition Problems
- Module 4 Vocabulary Cards
  - If necessary, review Vocabulary Cards before teaching
- Any hands-on tool or manipulative (e.g., clips, candies, cubes)



Teacher	**Let's work on addition. Today, let's think about addition as combining. What does it mean to combine?**
Students	Put together.
Teacher	**When we combine, we put things together. When you cook, you put ingredients together. For example, to make macaroni and cheese, you combine what?**
Students	Macaroni noodles and cheese!
Teacher	**That's right. You combine macaroni and cheese! Now, let's think about combining numbers. Look at this problem.** (Show problem.)
Teacher	**First, I notice a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**We'll add by combining. Let's show each addend with our clips. An addend is one of the numbers we add. Then we'll combine the clips for a sum. Let's do this together.** (Move clips to workspace.)
Teacher	**Our first addend is __. What's our first addend?**
Students	__.
Teacher	**Let's show this addend by showing __ clips.** (Show clips.)
Teacher	**How many clips?**
Students	__.
Teacher	**Our second addend is __. What's our second addend?**
Students	__.
Teacher	**Let's show the second addend by showing __ clips.** (Show clips.)
Teacher	**How many clips?**
Students	__.

Teacher	**So, we have __ plus __. Let's add by combining. What does combining mean?**
Students	To put together.
Teacher	**Yes. Let's combine, or put together, the __ clips and __ clips.** (Move two sets of clips together.)
Teacher	**To learn the sum, let's count the clips.** (Count clips.)
Teacher	**How many clips are there in total or altogether?**
Students	__.
Teacher	**Yes! There are __ clips. So, __ plus __ equals __. Let's say that together.**
Students	__ plus __ equals __.
Teacher	**Let's say it together again.**
Students	__ plus __ equals __.
Teacher	**So, if you have a set of __ and a set of __, when you combine (or put together) the sets, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or parts in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets.
Teacher	**What does it mean to combine?**
Students	To put together.
Teacher	**How could you explain combining to a friend?**
Students	We started with two different sets of clips. We combined the sets by putting all the clips together. The sum is the total number of clips.

Example

$$\begin{array}{r} 7 \\ +\ 4 \\ \hline 11 \end{array}$$

Teacher	**Let's work on addition. Today, let's think about addition as combining. What does it mean to combine?**
Students	Put together.
Teacher	**When we combine, we put things together. Let's think about combining numbers. Look at this problem.** (Show problem.)
Teacher	**First, I notice a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**We'll add by combining. Let's show each addend with our frogs. What's an addend?**
Students	An addend is one of the numbers we add.
Teacher	**Our first addend is 7. What's our first addend?**

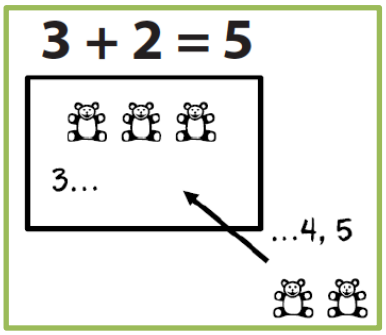
Students	7.
Teacher	**Let's show this addend by showing 7 frogs.**
	(Show 7 frogs.)
Teacher	**How many frogs?**
Students	7.
Teacher	**Our second addend is 4. What's our second addend?**
Students	4.
Teacher	**Let's show the second addend by showing 4 frogs.**
	(Show 4 frogs.)
Teacher	**How many frogs?**
Students	4.
Teacher	**So, we have 7 plus 4. Let's add by combining. What does combining mean?**
Students	To put together.
Teacher	**Yes. Let's combine, or put together, the 7 frogs and the 4 frogs.**
	(Move two sets of frogs together.)
Teacher	**To learn the sum, let's count the frogs. Count with me.**
	(Count: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.)
Teacher	**How many frogs are there in total or altogether?**
Students	11.
Teacher	**Yes! There are 11 frogs. So, 7 plus 4 equals 11. Let's say that together.**
Students	7 plus 4 equals 11.
Teacher	**Let's say it together again.**
Students	7 plus 4 equals 11.
Teacher	**So, if you have a set of 7 and a set of 4, when you combine (or put together) the sets, the sum is 11. 7 plus 4 equals 11. Let's review. What's an addend?**
Students	One of the sets or parts in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you combine sets.
Teacher	**What does it mean to combine?**
Students	To put together.
Teacher	**How could you explain combining to a friend?**
Students	We started with two different sets of frogs. We combined the sets by putting all the frogs together. The sum is the total number of frogs.

(2) Addition as Joining

Routine

Materials:

- Module 4 Problems
- Module 4 Vocabulary Cards
  - If necessary, review Vocabulary Cards before teaching
- Any hands-on tool or manipulative (e.g., clips, candies, cubes)



Teacher	**Let's work on addition. Today, let's think about addition as joining. What does it mean to join?**
Students	To add more to a set.
Teacher	**When we join, we add more to a group. When you're at recess and you want to join your friends, you walk to your friends and join their group. For example, if you want to join a sports team, what does that mean?**
Students	Become a member of the team and join other people to play a sport.
Teacher	**That's right. If you want to join a team, you become a member of the team. There are now more members on the team. Now, let's think about joining in addition. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.
Teacher	**Today we'll add by joining, but there are other ways to add. Let's start by showing the first addend with our candies and then joining more candies to that set for a sum. Let's do this together.** (Move candies to workspace.)
Teacher	**Our first addend is __. What's our first addend?**
Students	__.
Teacher	**Let's show this addend by showing __ candies.** (Show candies.)
Teacher	**How many candies?**
Students	__.
Teacher	**Our second addend is __. What's our second addend?**
Students	__.
Teacher	**Let's show the second addend by showing __ candies.** (Show candies.)
Teacher	**How many candies?**
Students	__.
Teacher	**Now, let's join the second addend to the first set of candies. We'll add by joining. What does joining mean?**

Students	To add more to a set.
Teacher	**Yes. Let's join the second addend to the first set. We started with __ candies. How many candies?**
Students	__. (first addend)
Teacher	**To join, we count on from the first set. So, we started with __ candies and we join the second set of candies by counting on from __. Watch me: __** (first addend)**, __, __, __, …** (Add second set of candies to first set.)
Teacher	**The sum is the last number we said. We counted __. What's the sum?**
Students	__.
Teacher	**How many candies are there in total or altogether?**
Students	__.
Teacher	**Yes! There are __ candies. So, __ plus __ equals __. Let's say that together.**
Students	__ plus __ equals __.
Teacher	**Let's say it together again.**
Students	__ plus __ equals __.
Teacher	**So, if you have a set of __ and join __ to the set, the sum is __. __ plus __ equals __. Let's review. What's an addend?**
Students	One of the sets or parts in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you join sets.
Teacher	**What does it mean to join?**
Students	To add more to a set.
Teacher	**How could you explain joining to a friend?**
Students	We started with one set of candies. We joined more candies to that set. The sum is the total number of candies.

Example

$$\begin{array}{r} 7 \\ +\ 4 \\ \hline 11 \end{array}$$

Teacher	**Let's work on addition. Today, let's think about addition as joining. What does it mean to join?**
Students	To add more to a set.
Teacher	**When we join, we add more to a group. Now, let's think about joining in addition. Look at this problem.** (Show problem.)
Teacher	**First, I see a plus sign** (point). **The plus sign tells us to add. What does the plus sign mean?**
Students	To add.

Teacher	**Today we'll add by joining, but there are other ways to add. Let's start by showing the first addend with our cubes and then joining more cubes to that set for a sum. Let's do this together.**
	(Move cubes to workspace.)
Teacher	**Our first addend is 7. What's our first addend?**
Students	7.
Teacher	**Let's show this addend by showing 7 cubes.**
	(Show 7 cubes.)
Teacher	**How many cubes?**
Students	7.
Teacher	**Our second addend is 4. What's our second addend?**
Students	4.
Teacher	**Let's show the second addend by showing 4 cubes.**
	(Show 4 cubes.)
Teacher	**How many cubes?**
Students	4.
Teacher	**Now, let's join the second addend to the first set of cubes. We'll add by joining. What does joining mean?**
Students	To add more to a set.
Teacher	**Yes. Let's join the second addend to the first set. We started with 7 cubes. How many cubes?**
Students	7.
Teacher	**To join, we count on from the first set. So, we started with 7 cubes and we join the second set of cubes by counting on from 7. Watch me: 7** (point to set of 7)**: 8** (add 1 cube)**, 9** (add 1 cube)**, 10** (add 1 cube)**, 11** (add 1 cube)**.**
Teacher	**The sum is the last number we said. We counted 11. What's the sum?**
Students	11.
Teacher	**How many cubes are there in total or altogether?**
Students	11.
Teacher	**Yes! There are 11 cubes. So, 7 plus 4 equals 11. Let's say that together.**
Students	7 plus 4 equals 11.
Teacher	**Let's say it together again.**
Students	7 plus 4 equals 11.
Teacher	**So, if you have a set of 7 and join 4 to the set, the sum is 11. 7 plus 4 equals 11. Let's review. What's an addend?**
Students	One of the sets or parts in an addition problem.
Teacher	**What's a sum?**
Students	The total number when you join sets.
Teacher	**What does it mean to join?**
Students	To add more to a set.
Teacher	**How could you explain joining to a friend?**
Students	We started with one set of cubes. We joined more cubes to that set. The sum is the total number of cubes.

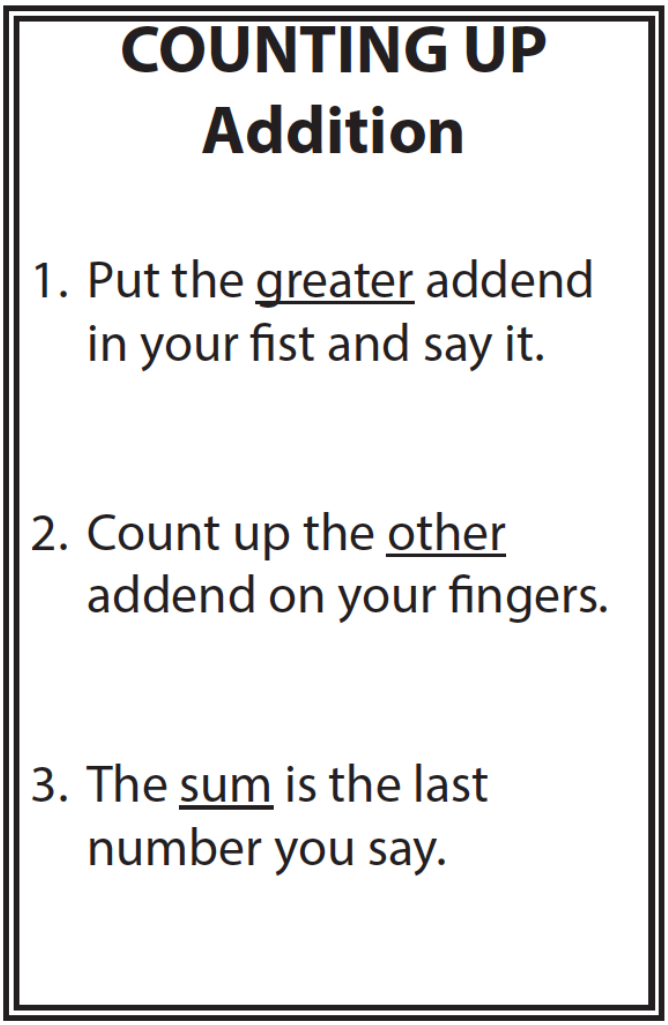
D. Problems for Use During Instruction

See Module 4 Problem Sets.

E. Vocabulary Cards for Use During Instruction

See Module 4 Vocabulary Cards.

F. Supplementary



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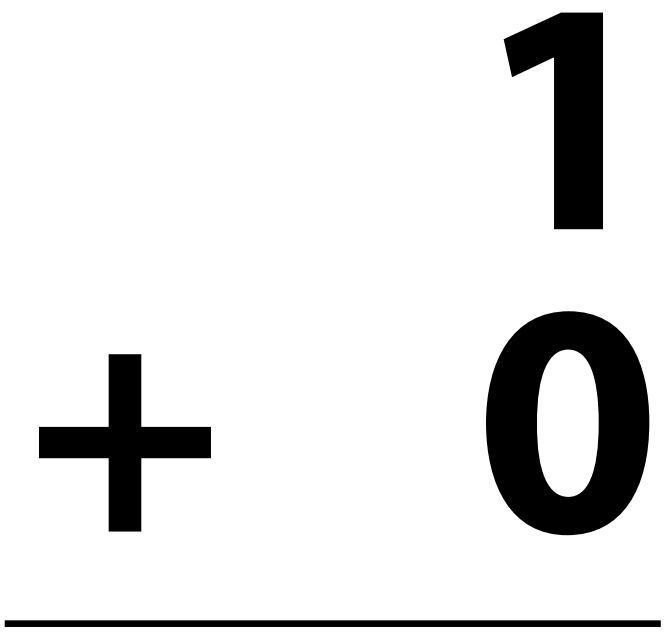
Module 4:

Concepts of Addition

Problem Sets

A. Single-digit addition facts (60)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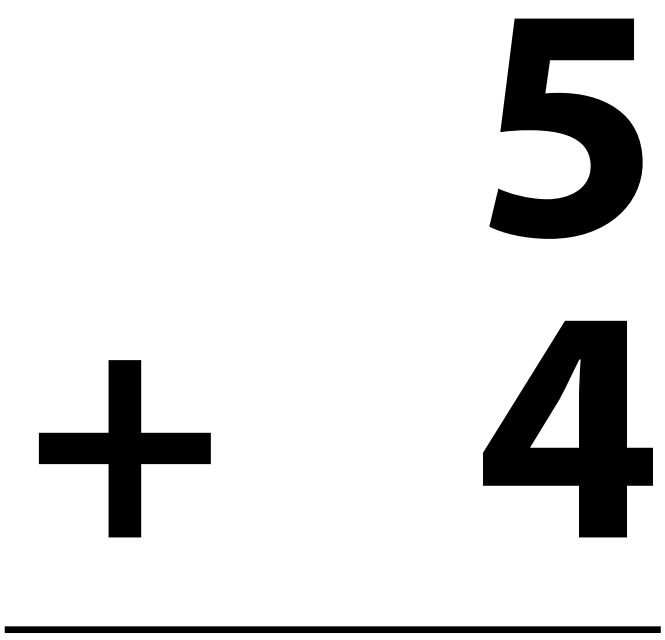
+ 0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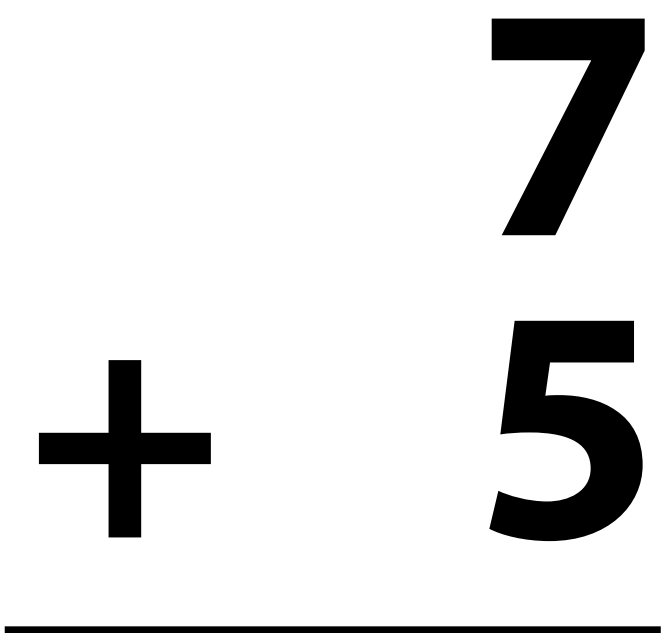
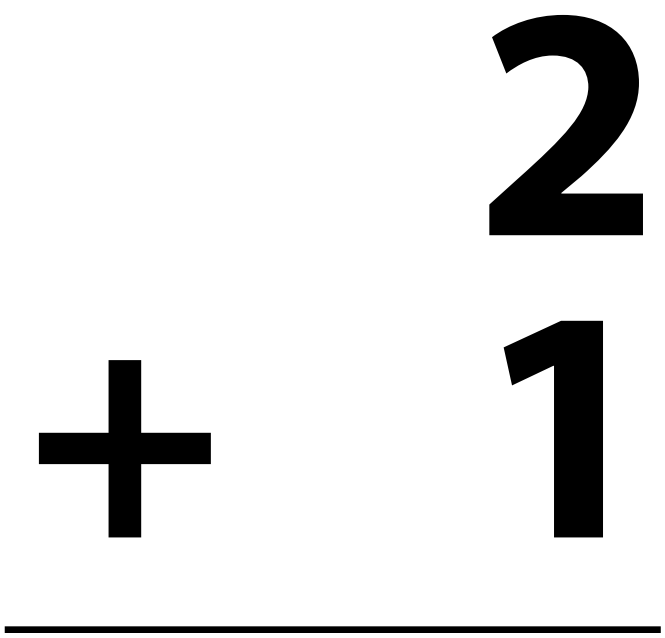
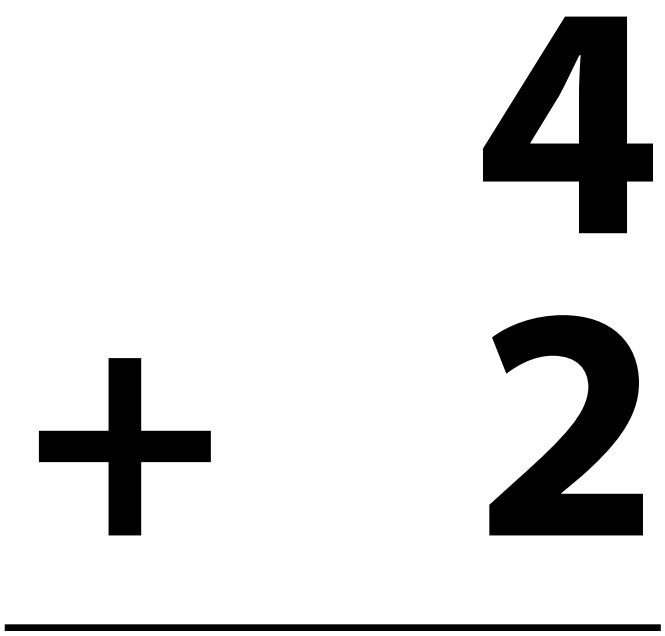
+ 4


7
+ 5

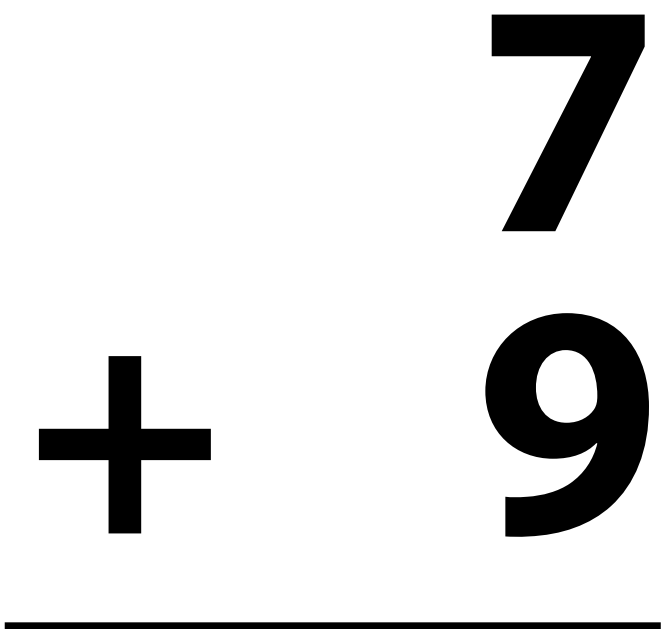

2
+ 1

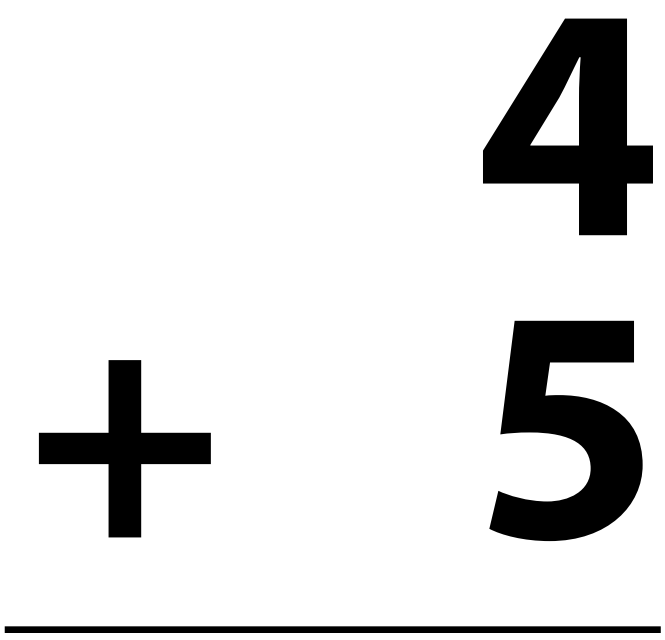
$$\begin{array}{r} 7 \\ +\ 6 \\ \hline \end{array}$$

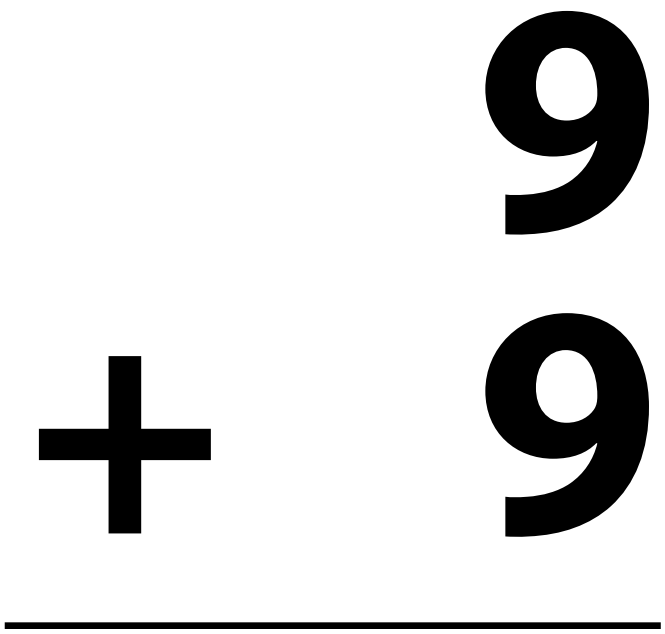

4
+ 2

$$\begin{array}{r} 9 \\ +\ 8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +\ 3 \\ \hline \end{array}$$

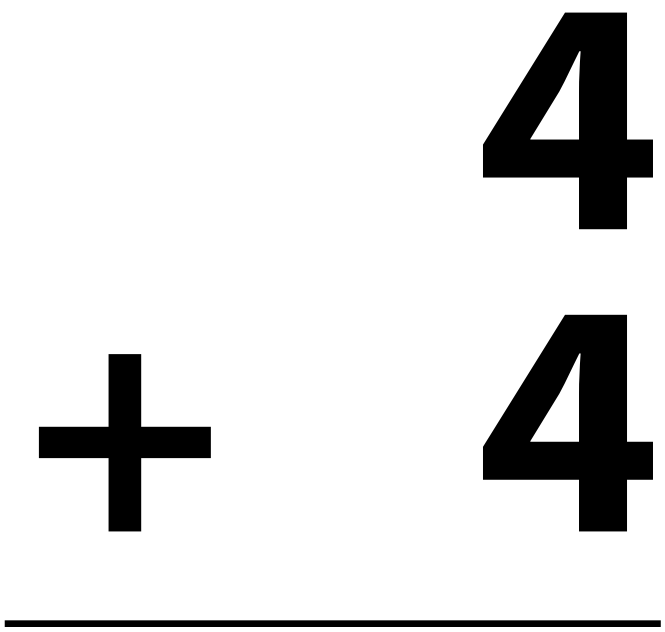

7
+ 9

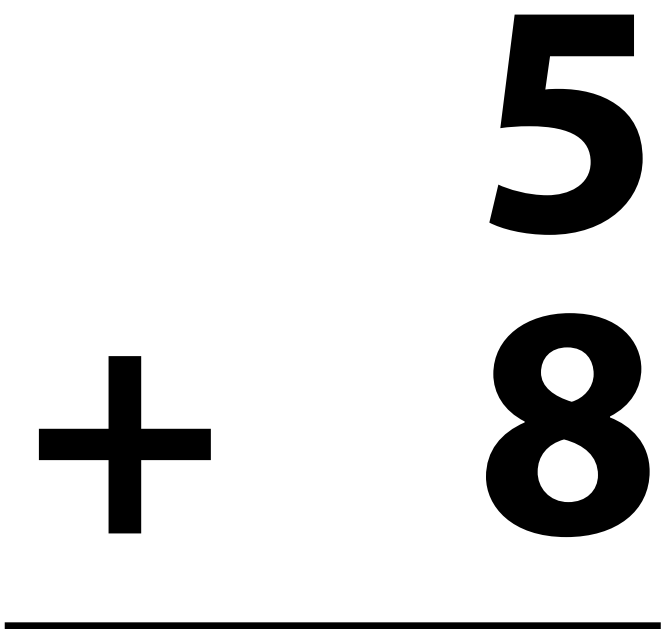

4
+ 5


9
+ 9

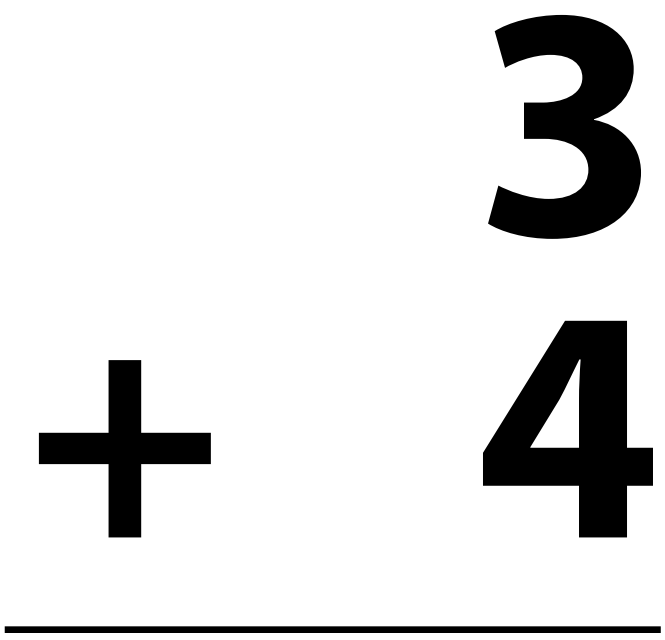
$$\begin{array}{r} 2 \\ +\ 6 \\ \hline \end{array}$$

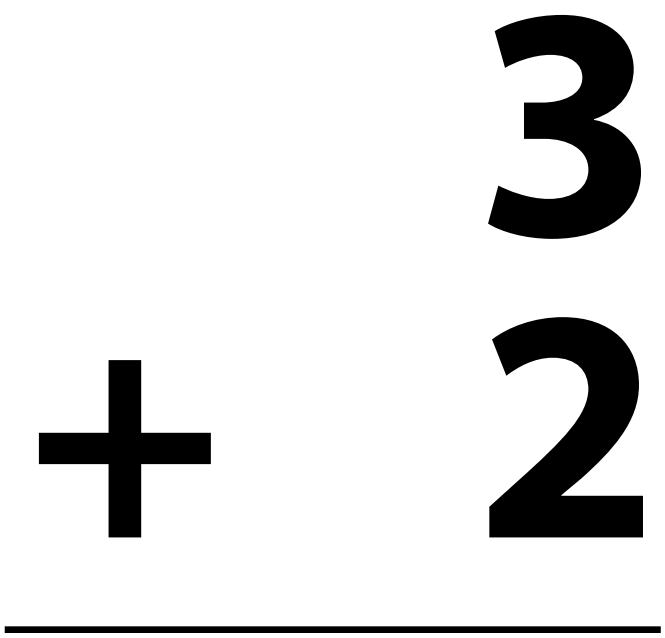
$$\begin{array}{r} 7 \\ +\ 8 \\ \hline \end{array}$$


4
+ 4

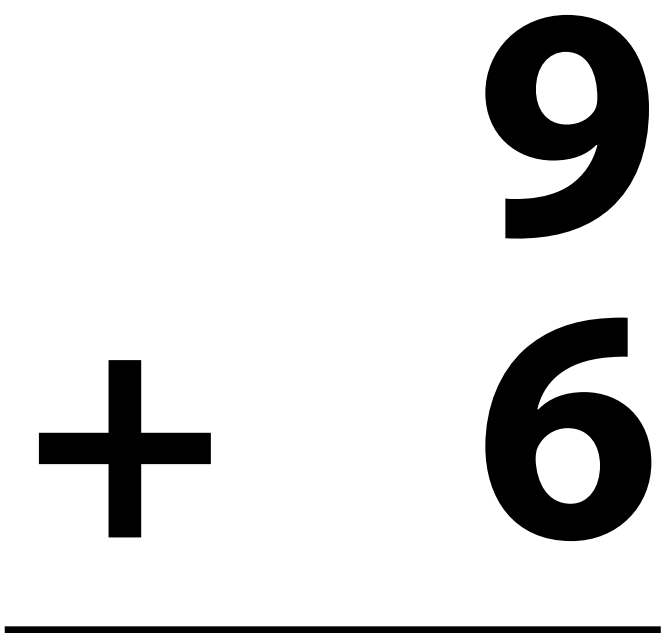

5
+ 8

$$\begin{array}{r} 4 \\ +\ 7 \\ \hline \end{array}$$


3
+ 4

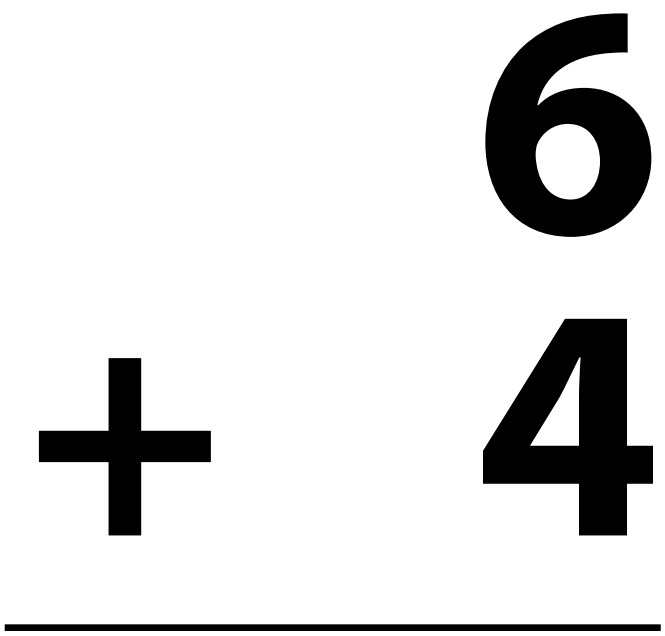

3
+ 2

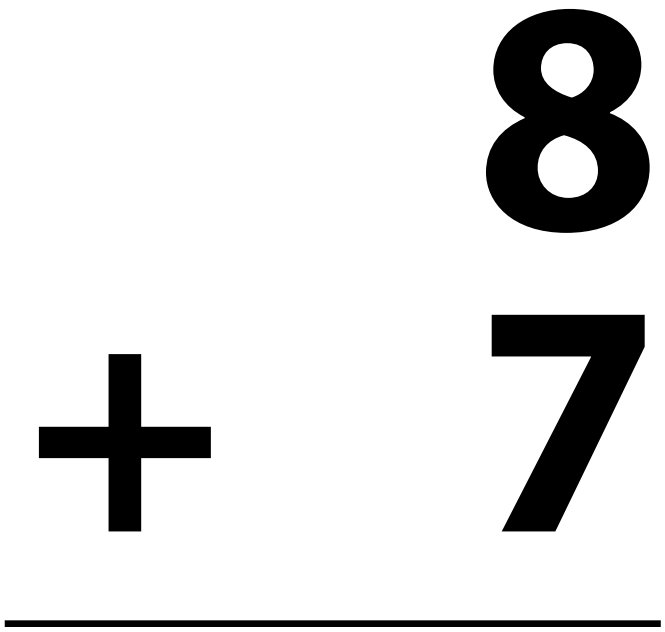
$$\begin{array}{r} 4 \\ +\ 3 \\ \hline \end{array}$$


9
+ 6

$$\begin{array}{r} 8 \\ +\ 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +\ 0 \\ \hline \end{array}$$


6
+ 4


8
+ 7

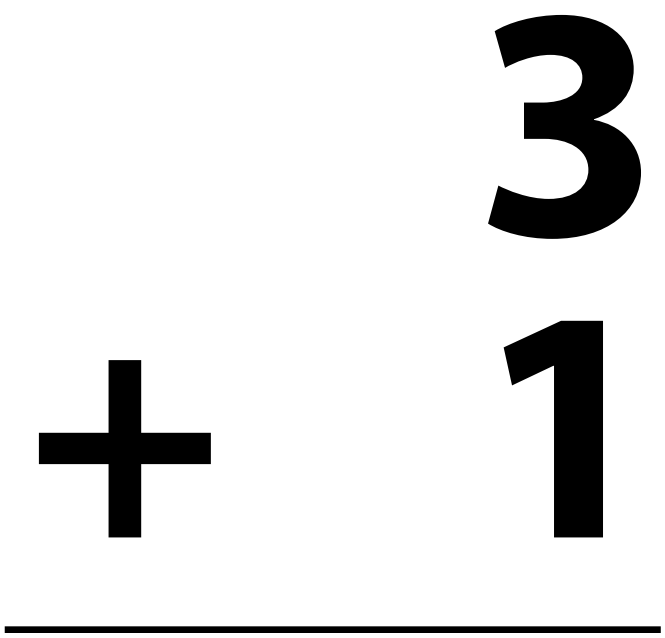
$$\begin{array}{r} 5 \\ +\ 3 \\ \hline \end{array}$$

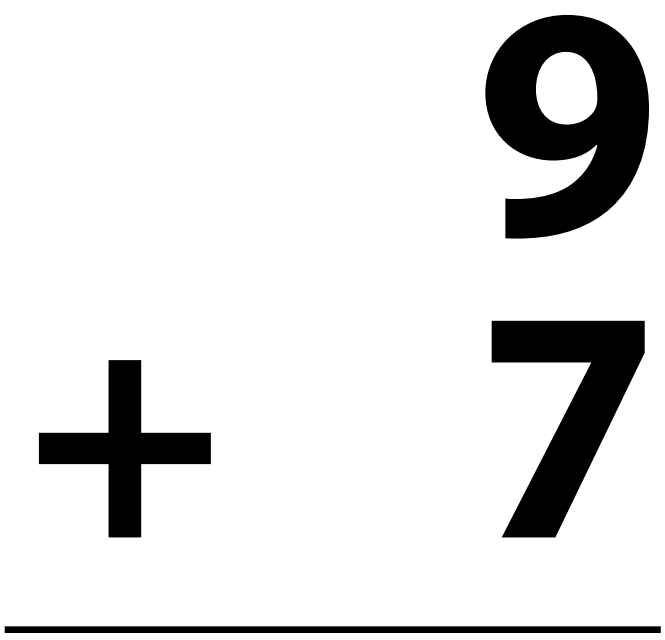
$$\begin{array}{r} 7 \\ +\ 7 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ +\ 5 \\ \hline \end{array}$$

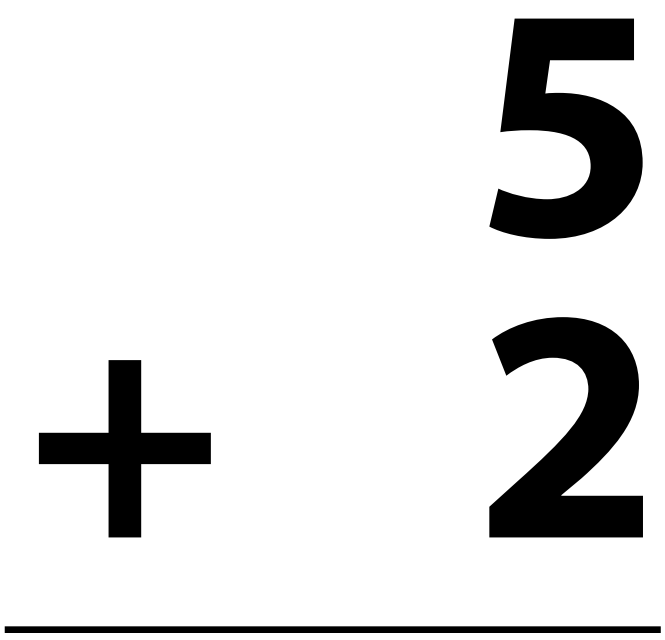
$$\begin{array}{r} 2 \\ +\ 0 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +\ 4 \\ \hline \end{array}$$


3
+ 1


9
+ 7

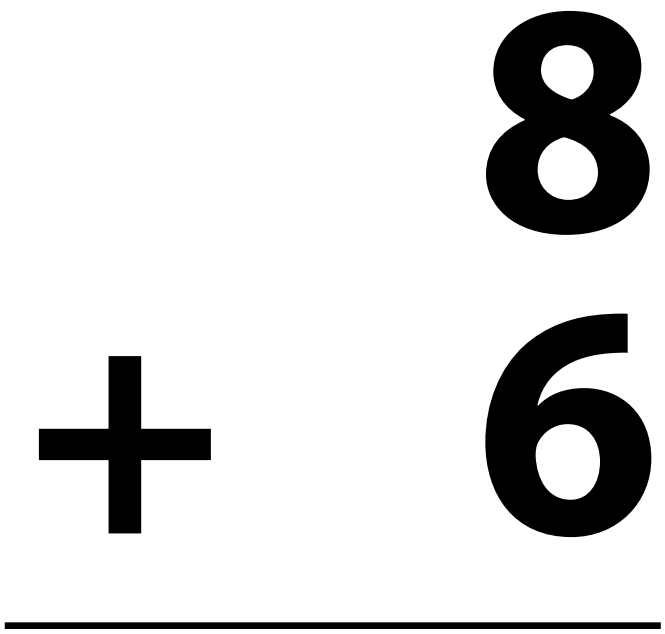
$$\begin{array}{r} 4 \\ +\ 1 \\ \hline \end{array}$$


5
+ 2

$$\begin{array}{r} 6 \\ +\ 6 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ +\ 1 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +\ 5 \\ \hline \end{array}$$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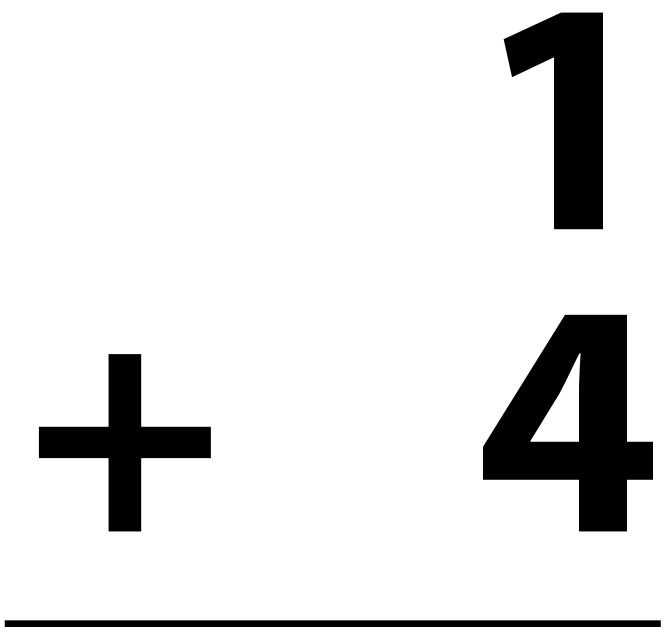
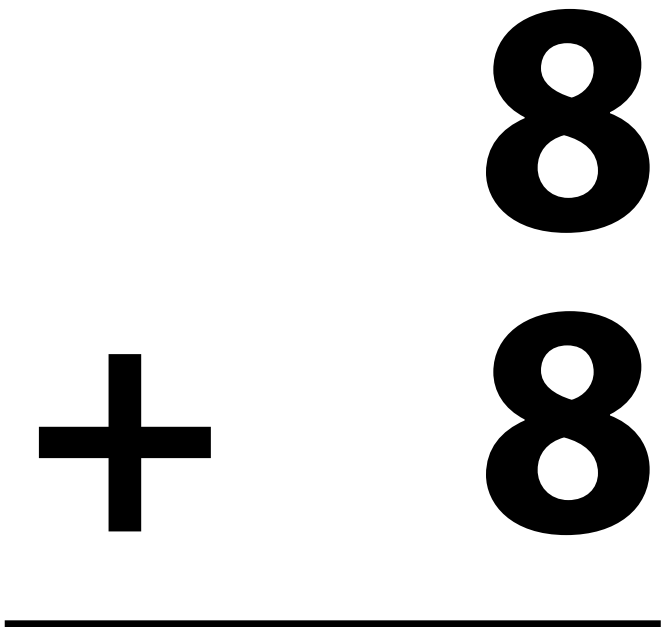
+ 6

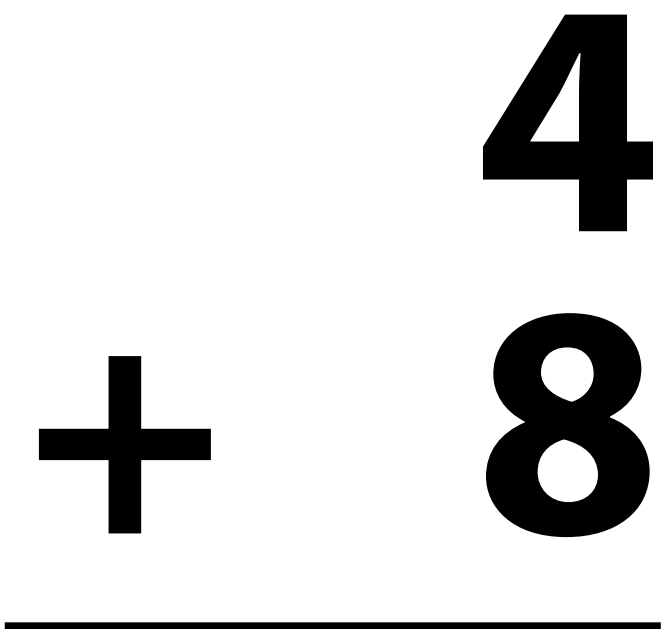
$$\begin{array}{r} 0 \\ +\ 7 \\ \hline \end{array}$$

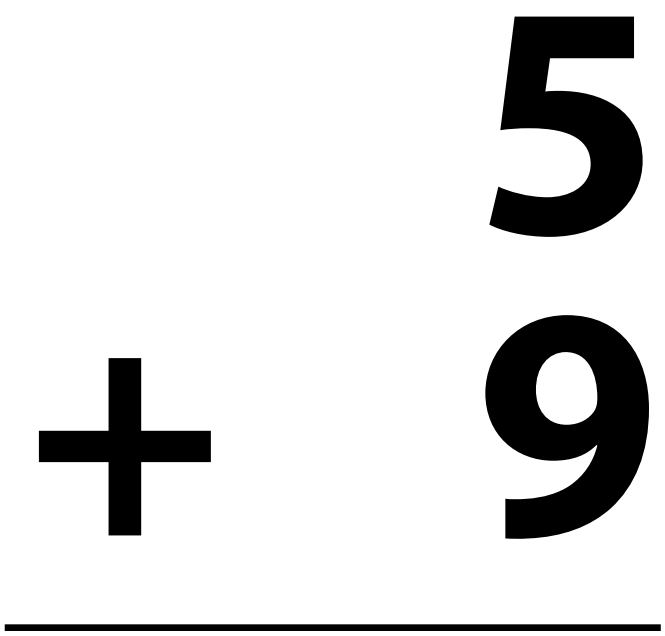

1
+ 4

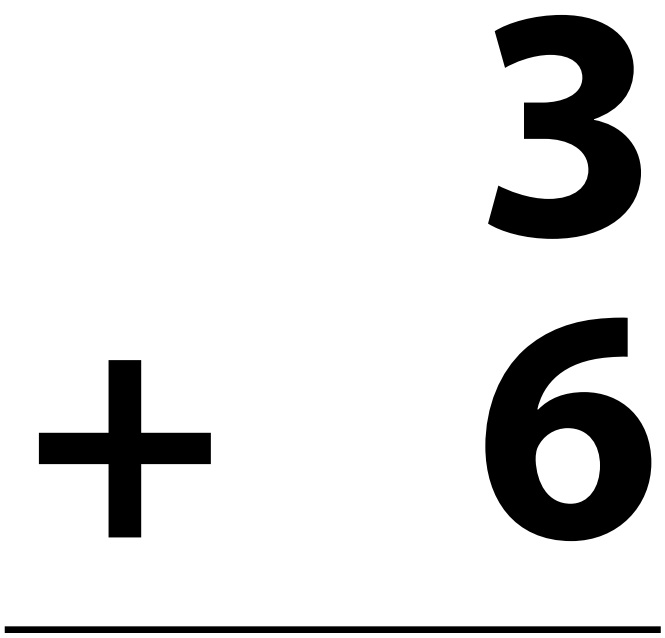
$$\begin{array}{r} 2 \\ +\ 3 \\ \hline \end{array}$$



$$\begin{array}{r} 5 \\ +\ 5 \\ \hline \end{array}$$

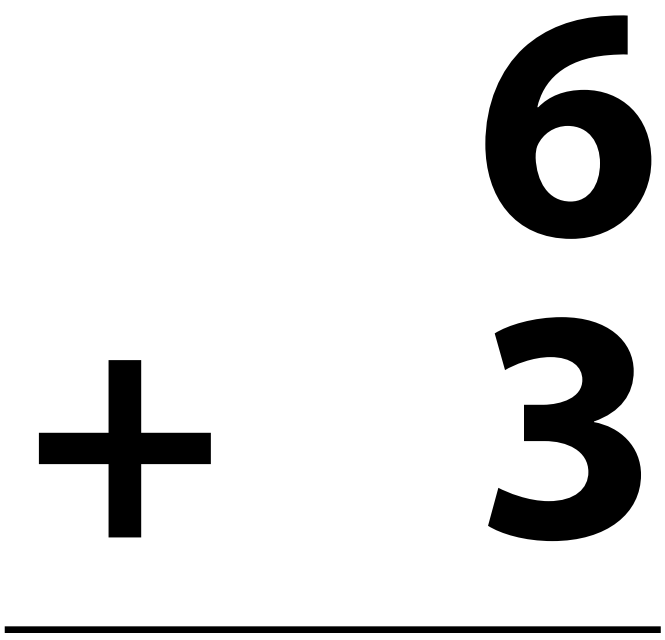

4
+ 8


5
+ 9


3
+ 6

$$\begin{array}{r} 1 \\ +\ 2 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ +\ 9 \\ \hline \end{array}$$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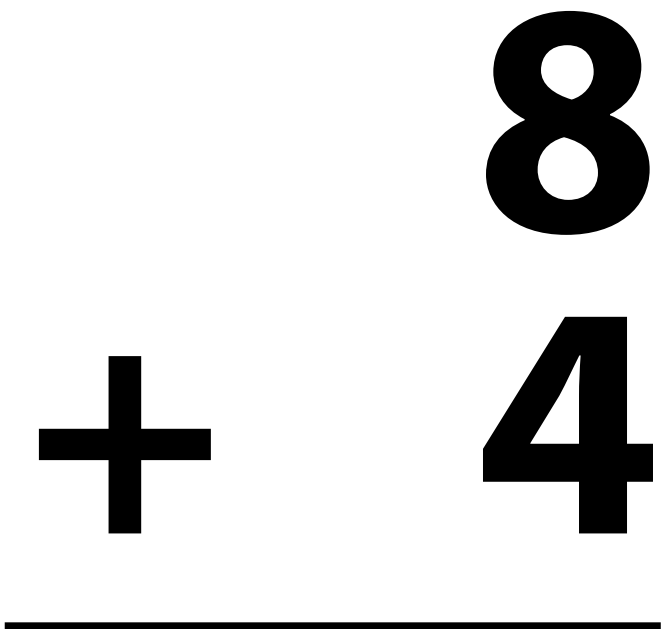
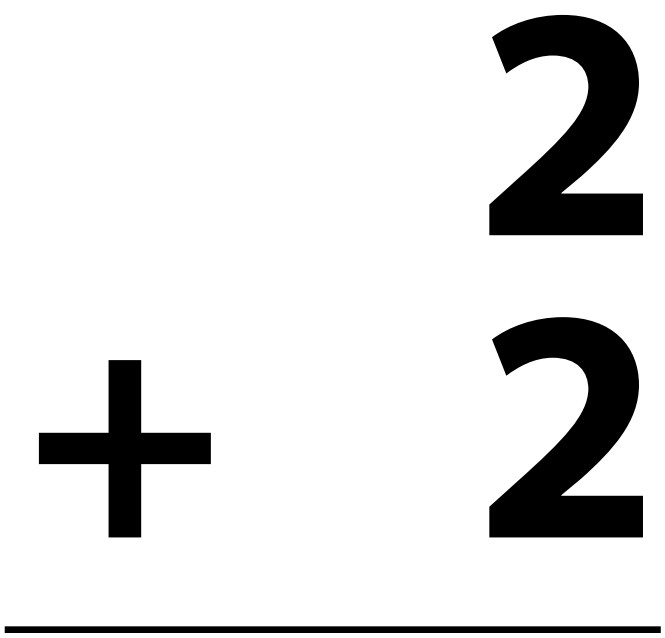
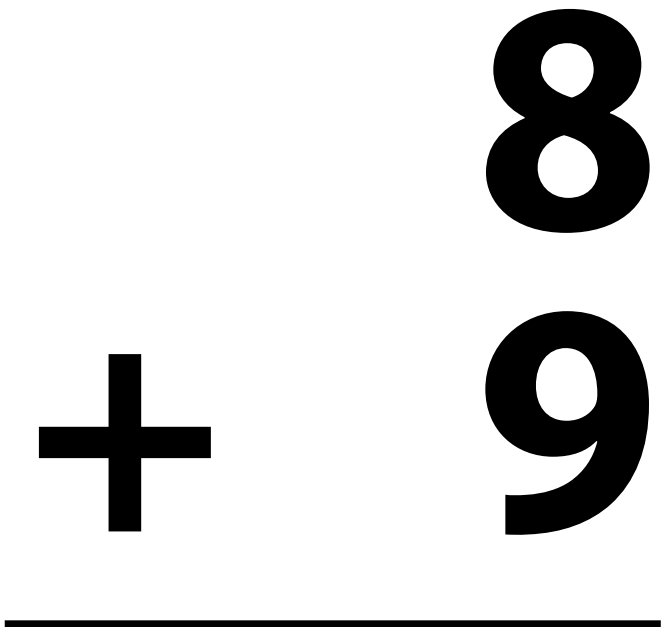
+ 3


8
+ 4

$$\begin{array}{r} 3 \\ +\ 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +\ 7 \\ \hline \end{array}$$


2
+ 2


8
+ 9

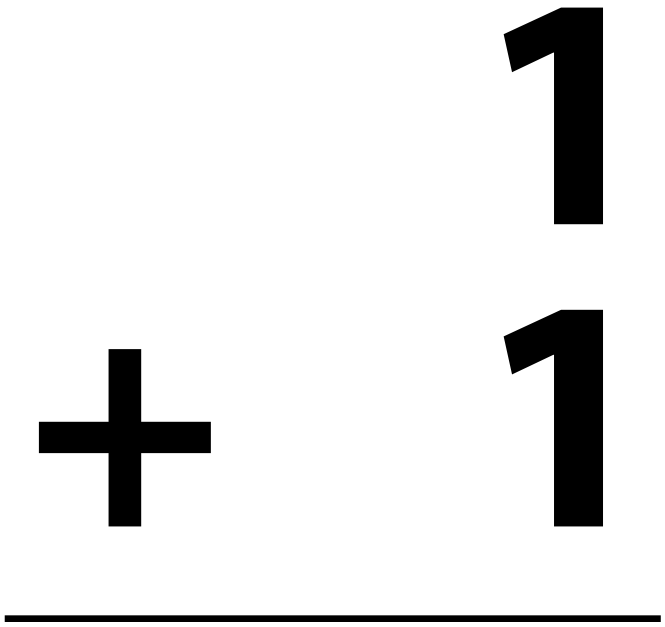
$$\begin{array}{r} 1 \\ +\ 5 \\ \hline \end{array}$$

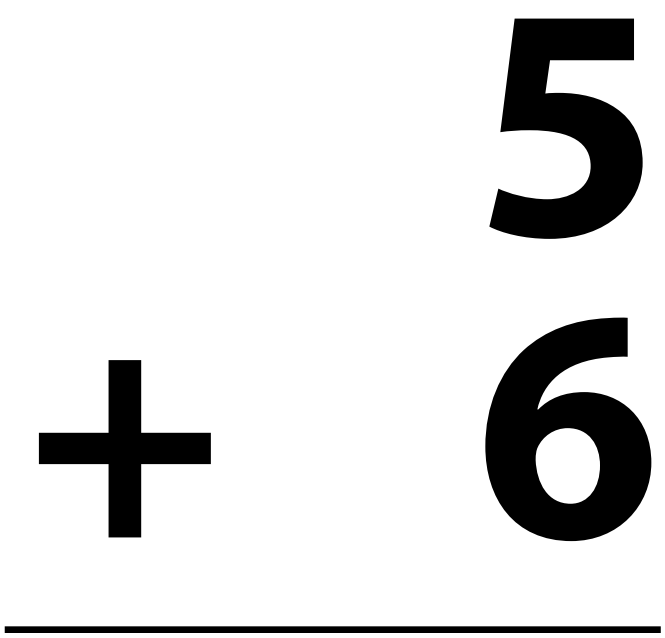
$$\begin{array}{r} 2 \\ +\ 4 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ +\ 0 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +\ 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +\ 8 \\ \hline \end{array}$$




5
+ 6

Module 4:

Concepts of Addition

Vocabulary Cards

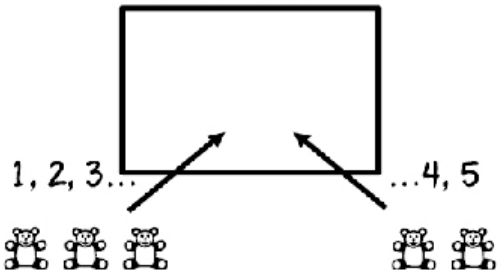
add/addition
addend
equal sign
join
plus sign
sum
together

add/addition

To put amounts together to find the sum or to increase a set.

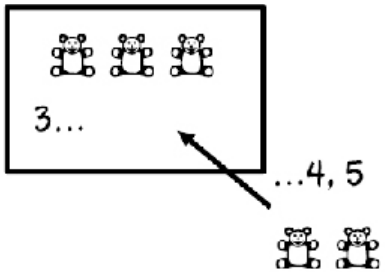
To put amounts together

3 + 2 = 5



To increase a set

3 + 2 = 5



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addend

Any numbers that are added together.

6 + 2 = 8

6 and 2 are addends

equal sign

The symbol that tells you that two sides of an equation are the same, balanced, or equal.

12 + 8 = 20

= is the equal sign

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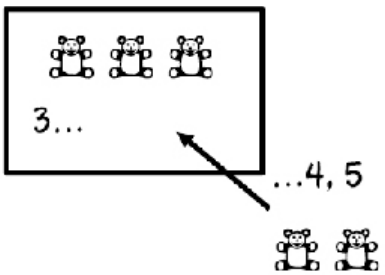
join

To add to an existing set.



plus sign

The symbol that tells you to add.

$$5 + 4 = 9$$

+ is the plus sign

---

sum

The result of adding two or more numbers or the total number when you combine sets.

$$7 + 2 + 1 = 10$$

10 is the sum

together

To combine sets or numbers.