

# Mental Math Strategies for Subtraction



Dear Family,

This week your child is learning how to use different mental math strategies for subtraction.

Here are some subtraction strategies that your child will learn.

### Count On

A subtraction problem can be solved by counting on. What is  $15 - 9$ ? Your child can think of  $15 - 9 = ?$  as  $9 + ? = 15$ . Count on from 9 to 15. 9, ... 10, 11, 12, 13, 14, 15

You counted on 6 numbers. That means  $9 + 6 = 15$ , so  $15 - 9 = 6$ .

### Make a Ten

The "make a ten" strategy can be modeled with an open number line (a number line not drawn to scale, with only the numbers important to the problem labeled).

$$15 - 9 = ?$$

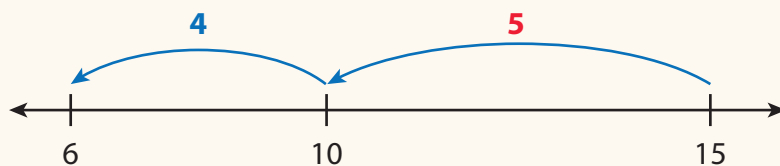
$$15 - 5 = 10$$

$$10 - 4 = 6$$

Think of 9 as **5** + **4**.

Subtract **5** to get to 10.

Then subtract the remaining **4**.



$$15 - 9 = 6$$

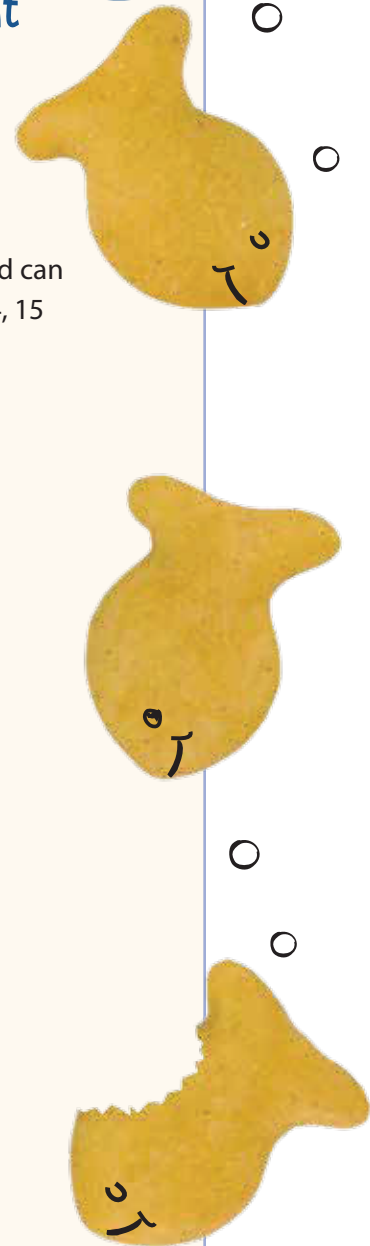
### Use Fact Families

A **fact family** is a group of related equations that use the same numbers but in a different order.

$$9 + 6 = 15 \quad 6 + 9 = 15 \quad 15 - 9 = 6 \quad 15 - 6 = 9$$

$15 - 9 = ?$  is the same as  $9 + ? = 15$ , and if your child knows that  $9 + 6 = 15$ , then he or she knows that  $15 - 9 = 6$ .

Invite your child to share what he or she knows about using fact families by doing the following activity together.



## ACTIVITY FACT FAMILIES

Do this activity with your child to explore using mental math strategies for subtraction.

Work with your child to create fact family cards by cutting out the facts below and coloring the backs or by writing the facts on index cards. Then use the cards for the activity.

- Each player chooses one of the single-number cards (14 or 17) and places it faceup in front of him or her. Shuffle the fact cards. Place them facedown in 2 rows with 4 cards in each row.
- Players take turns flipping over two cards.
  - If either of the cards are not in the same fact family as the player's number card, then put them both back facedown.
  - If both of the cards are in the same fact family as the number card, then the player keeps the cards.
- The first player to find the 4 cards that make a family that goes with his or her number card wins.



$$8 + 6 = 14$$

$$6 + 8 = 14$$

$$14 - 8 = 6$$

$$14 - 6 = 8$$

$$9 + 8 = 17$$

$$8 + 9 = 17$$

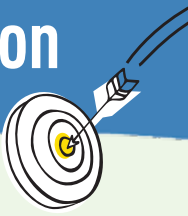
$$17 - 9 = 8$$

$$17 - 8 = 9$$

$$14$$

$$17$$

# Explore Using Mental Math Strategies for Subtraction



## Learning Target

- Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

**SMP** 1, 2, 3, 4, 5, 6, 7, 8

In this lesson you will use different strategies to subtract numbers in your head. Use what you know to try to solve the problem below.

**Chen has 14 stamps. He uses 6 of them to mail letters. How many stamps does Chen have left?**



## TRY IT



## Math Toolkit

- counters 
- 10-frames



## DISCUSS IT

### Ask your partner:

Do you agree with me? Why or why not?

### Tell your partner: I

am not sure how to find the answer because . . .

# CONNECT IT

## 1 LOOK BACK

How many stamps does Chen have left? .....

## 2 LOOK AHEAD

You can subtract numbers in different ways. Making a ten is one way to subtract from teen numbers.

Think about  $14 - 5$ . Break apart the 5. Show how to subtract from 14 to make 10.

○	○	○	○	○
○	○	○	○	○

○	○	○	○	

a. What do you need to subtract from 14 to make 10?

.....

b. How much more do you need to subtract? .....

## 3 REFLECT

Why is subtracting 4 and then subtracting 1 the same as subtracting 5?

.....

.....

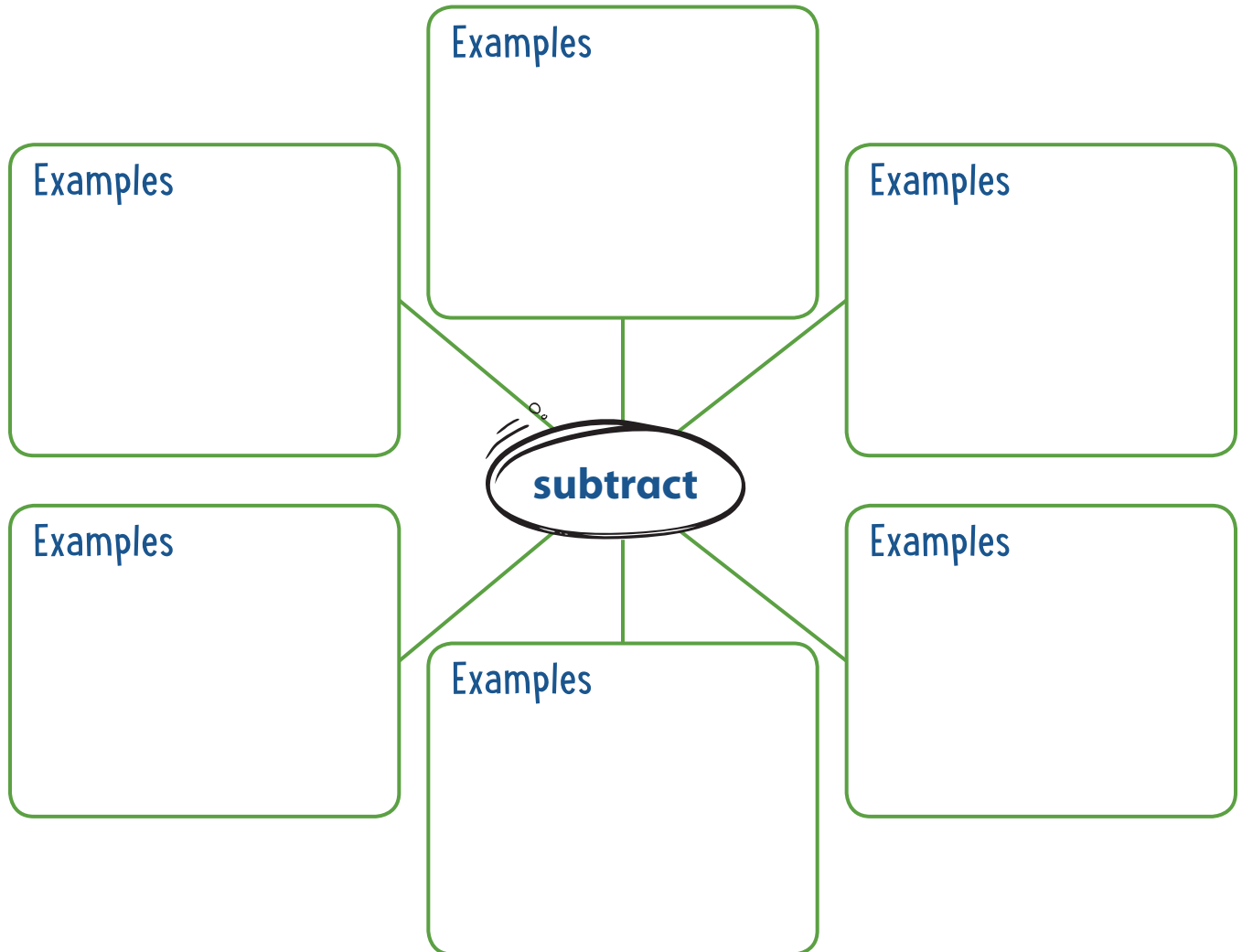
.....

.....



## Prepare for Using Mental Math Strategies for Subtraction

- 1 Think about what you know about different ways to subtract. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.



- 2 Explain how you would subtract  $11 - 7$ .

3 Solve the problem. Show your work.

**Parnell has 12 stickers. He gives 7 of them to friends. How many stickers does Parnell have left?**



**Solution** .....

4 Check your answer. Show your work.

# Develop Counting On and Making a Ten to Subtract

Read and try to solve the problem below.

**Sarah buys 11 balloons for her party. During the party, she gives away 8 of the balloons. How many balloons does Sarah have left?**

## TRY IT



### Math Toolkit

- counters
- 10-frames



## DISCUSS IT

### Ask your partner:

Why did you choose that strategy?

**Tell your partner:** A model I used was ...  
It helped me ...



Explore different ways to understand solving subtraction problems in your head.

Sarah buys 11 balloons for her party. During the party, she gives away 8 of the balloons. How many balloons does Sarah have left?

### MODEL IT

You can count on to subtract.

You can find  $11 - 8 = ?$  by finding  $8 + ? = 11$ .

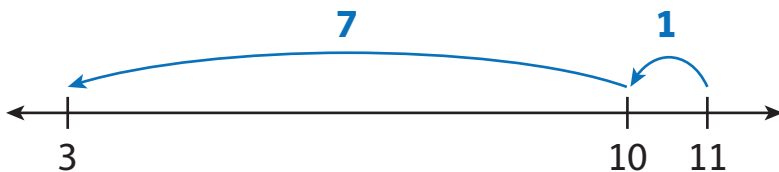
Start at 8 in the table. Count on until you reach 11.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20



### MODEL IT

You can make a ten to subtract.



Subtract 1 to make a ten.  $11 - 1 = 10$

Subtract 7 more to subtract 8 in all.

$10 - 7 = ?$



## CONNECT IT

Now you will use the problem from the previous page to help you understand how to count on or make a ten to subtract.

- 1 Use the first **Model It** on the previous page. What number do you get after you count on:

1 more than 8? .....

2 more than 8? .....

3 more than 8? .....

- 2 Complete the equations.

$$8 + \dots = 11 \qquad 11 - 8 = \dots$$

- 3 Use the second **Model It** on the previous page. Complete the equations.

$$11 - 1 = \dots$$

$$10 - 7 = \dots \text{ So, } 11 - 8 = \dots$$

- 4 How many balloons does Sarah have left? .....

- 5 **REFLECT**

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for subtracting in your head? Explain.

.....

.....

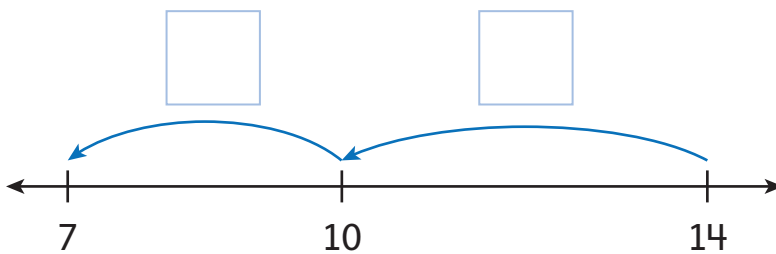
# APPLY IT

Use what you just learned to solve these problems.

- 6 Show how to find  $12 - 7 = ?$  by counting on.
  
- 7 Find  $14 - 7$  by making a ten using equations.

## Solution .....

- 8 Use your answer from problem 7 to fill in the squares on the open number line.



# Practice Counting On and Making a Ten to Subtract

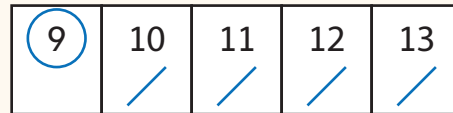
Study how the Example shows counting on to subtract in your head. Then solve problems 1–6.

## EXAMPLE

$$13 - 9 = ?$$

Think of it as  $9 + ? = 13$ .

Count on to get from 9 to 13.



The marks show how many you counted on.

Solve the addition problem.  $9 + 4 = 13$

Solve the subtraction problem.  $13 - 9 = 4$

1 Fill in the blanks in each equation.

$$9 - 4 = ? \text{ is the same as } \dots + ? = \dots$$

$$8 - 3 = ? \text{ is the same as } \dots + ? = \dots$$

$$11 - 7 = ? \text{ is the same as } \dots + ? = \dots$$

$$15 - 8 = ? \text{ is the same as } \dots + ? = \dots$$

2 Complete each addition fact to solve the subtraction equation.

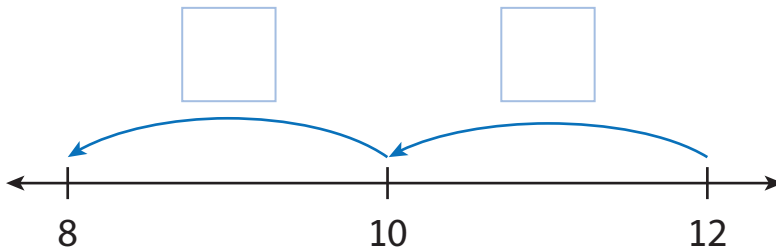
$$4 + \dots = 9, \text{ so } 9 - 4 = \dots$$

$$3 + \dots = 8, \text{ so } 8 - 3 = \dots$$

$$7 + \dots = 11, \text{ so } 11 - 7 = \dots$$

$$8 + \dots = 15, \text{ so } 15 - 8 = \dots$$

- 3 Make a ten to subtract. Fill in the squares on the open number line to show  $12 - 4 = 8$ .



- 4 Complete the equations.

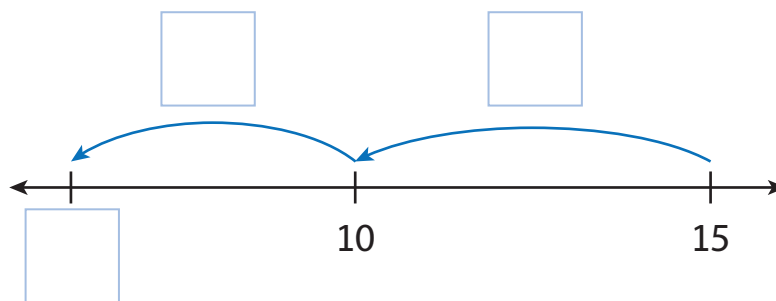
$$12 - \square = 10 \qquad 16 - \square = 10$$

$$13 - \square = 10 \qquad 15 - \square = 10$$

- 5 Fill in the squares to find  $15 - 9$ .

$$15 - 9 = ?$$

$$15 - 9 = \square$$



- 6 Jan circled the problems that she cannot solve in her head by making a ten.

$14 - 7$	$8 - 2$	$12 - 8$
$9 - 4$	$15 - 6$	

Look at all of the problems. Why does Jan not make a ten to solve the circled problems?

# Develop Using Fact Families to Help Subtract

Read and try to solve the problem below.

**There are 15 birds swimming in a pond. Then 9 birds fly away. How many birds are left?**

## TRY IT



### Math Toolkit

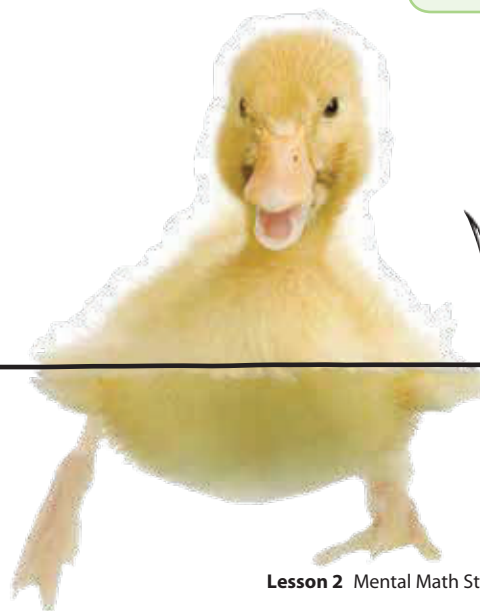
- number chart 1–20
- number lines



## DISCUSS IT

**Ask your partner:**  
How did you get started?

**Tell your partner:** I knew ... so I ...



Explore another way to understand solving subtraction problems in your head.

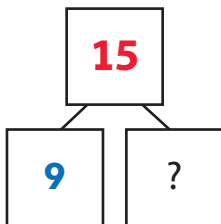
There are 15 birds swimming in a pond. Then 9 birds fly away. How many birds are left?

## MODEL IT

Use a fact family to help solve the problem.

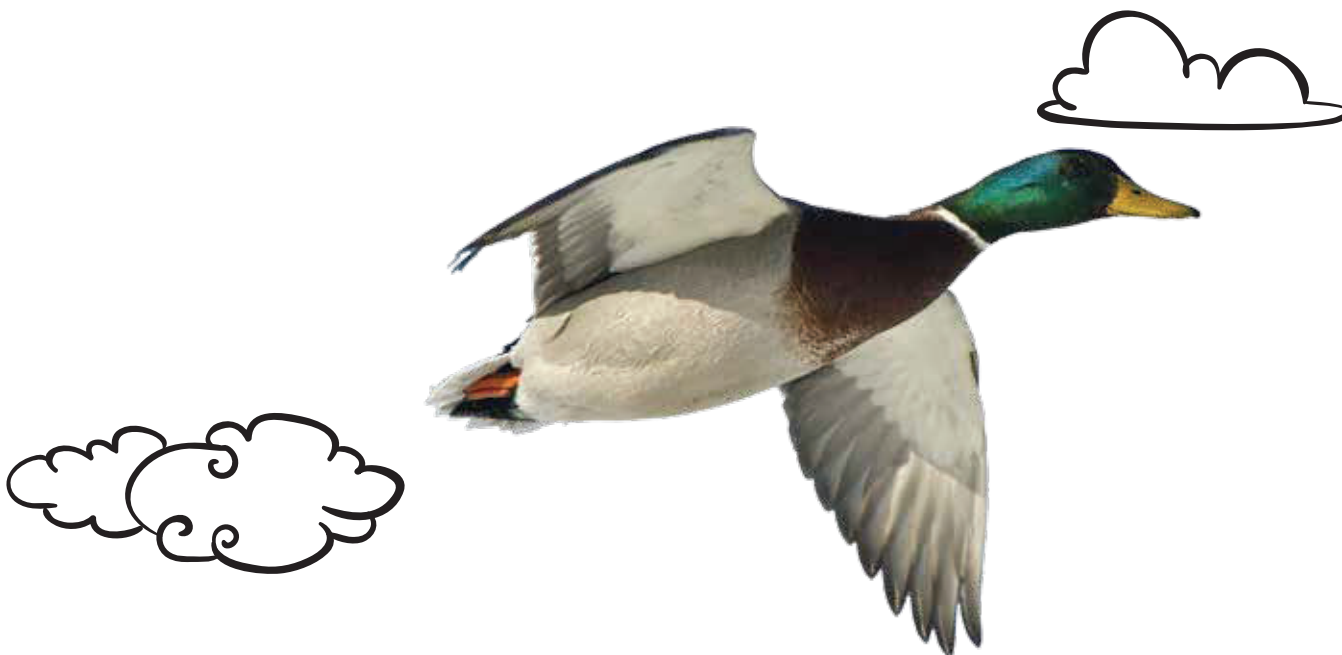
Find the **difference**  $15 - 9$ .

Use the number bond to write a **fact family**.



$$9 + ? = 15 \qquad 15 - 9 = ?$$

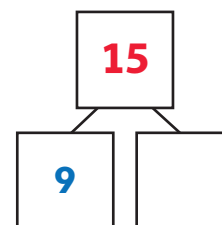
$$? + 9 = 15 \qquad 15 - ? = 9$$



## CONNECT IT

Now you will use the problem from the previous page to help you understand how to use a fact family to subtract.

- 1 Look at **Model It**. Complete the number bond.



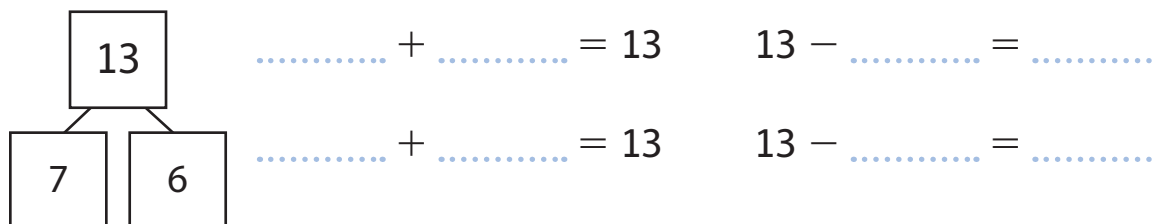
- 2 Use the number bond in problem 1 to complete the four facts for this fact family.

$$9 + \dots = 15 \qquad 15 - 9 = \dots$$

$$\dots + 9 = 15 \qquad 15 - \dots = 9$$

- 3 How many birds are left in the pond? .....

- 4 Use this number bond to complete another fact family.



$$\dots + \dots = 13 \qquad 13 - \dots = \dots$$

$$\dots + \dots = 13 \qquad 13 - \dots = \dots$$

## 5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model It**. Which models or strategies do you like best for solving subtraction problems in your head? Explain.

.....

.....

.....



## APPLY IT

Use what you just learned to solve these problems.

- 6 Tia says that the equations below belong to the same fact family because they both have 5 and 8. Do you agree? Explain.

$$5 + 8 = 13$$

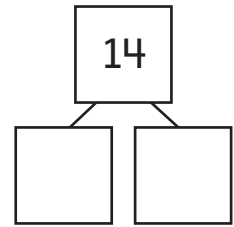
$$8 - 5 = 3$$

- 7 Fill in the blanks in the equation.

$14 - 9 = ?$  is the same as ..... + ? = .....

- 8 Fill in the number bond to find  $14 - 9$ .

- 9 How does picturing a number bond help you find  $14 - 9$  in your head?



- 10 Which equations are in the fact family with  $10 - 2 = 8$ ?

- Ⓐ  $8 + 2 = 10$
- Ⓑ  $10 - 8 = 2$
- Ⓒ  $10 + 2 = 12$
- Ⓓ  $12 - 8 = 4$
- Ⓔ  $2 + 8 = 10$

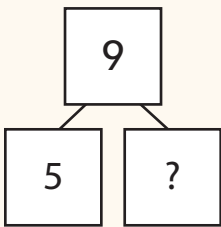
# Practice Using Fact Families to Help Subtract

Study the Example showing how adding helps you subtract.  
Then solve problems 1–6.

## EXAMPLE

Solve  $9 - 5$ .

Make a number bond.



Write an addition problem. Solve.

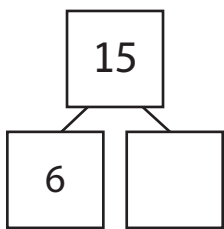
$$5 + ? = 9$$

$$5 + 4 = 9$$

Then solve the subtraction.

$$9 - 5 = 4$$

- 1 Complete the number bond to show  $15 - 6 = ?$ .



- 2 Write an addition equation for the number bond in problem 1. Then complete the subtraction equation.

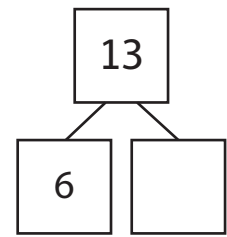
$$\dots + \dots = \dots$$

$$15 - 6 = \dots$$

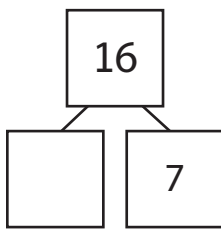
3 Complete the number bond. Write four equations.

..... + ..... = 13      13 - ..... = .....

13 = ..... + .....      ..... = 13 - .....



4 Complete the number bond to show  $16 - 7 = ?$ .



5 Write the fact family for the number bond in problem 4.

..... + ..... = .....      ..... + ..... = .....

..... - ..... = .....      ..... - ..... = .....

6 Jose bakes 12 muffins. He gives 9 muffins to his friends. How many muffins does Jose have left?

Write a subtraction equation for the problem. Then write and solve a related addition equation. Use the addition equation to solve the subtraction equation.

..... - ..... = ?

..... + ..... = .....

So, ..... - ..... = .....

Jose has ..... muffins left.



# Refine Using Mental Math Strategies for Subtraction

Complete the Example below. Then solve problems 1–3.

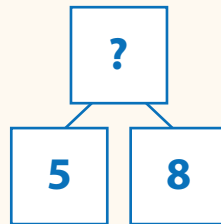
## EXAMPLE

**Kendra has some strawberries. She eats 5 of them. Now she has 8 strawberries. How many strawberries did Kendra start with?**

Write an equation with an unknown number.  
You can show the numbers in a number bond.

$$? - 5 = 8$$

Kendra eats 5 strawberries.  
Then she has 8 strawberries.  
Add  $8 + 5$  to find the unknown number that she started with.  
 $8 + 5 = 13$ . So,  $13 - 5 = 8$ .



**Solution** .....

## APPLY IT

- 1 Greg has 18 dollars. He spends 9 dollars on a game. How much money does Greg have left? Show your work.

Can making a ten help?



**Solution** .....

- 2 Find  $12 - 8$  by counting on. Show your work.

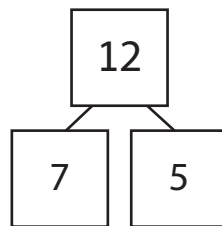
Which number will you count on from?



### Solution .....

- 3 Which equations would be in the fact family for the number bond?

- (A)  $12 = 7 + 5$   
(B)  $19 = 12 + 7$   
(C)  $7 = 12 - 5$   
(D)  $12 = 5 + 7$   
(E)  $5 = 12 - 7$



What do you know about all fact families?

Lily chose (B) as the correct answer. How did she get that answer?

# Practice Using Mental Math Strategies for Subtraction

- 1 Eli buys 12 oranges. He uses 7 of them to make a fruit salad. How many oranges does he have left? Show your work.

How can making a ten help?



**Solution** .....

- 2 Leti has some stickers. She gives 10 stickers to her brother. Leti has 10 stickers left. How many stickers did Leti have to begin with? Show your work.

Can you add to subtract?

**Solution** .....

- 3 Sonia has 15 toys. She puts 8 of them on a shelf. How many does she have left?  
 Could you use the equation to solve this problem?  
 Choose Yes or No for each equation.

	Yes	No
$? + 8 = 15$	(A)	(B)
$15 + 8 = ?$	(C)	(D)
$15 - 8 = ?$	(E)	(F)
$8 + 15 = ?$	(G)	(H)

- 4 What is  $13 - 9$ ?
- (A) 3
  - (B) 4
  - (C) 5
  - (D) 10

David chose (C) as the correct answer.  
 How did David get his answer?

Can you solve the problem by using related facts in the same fact family?



You can count on or make a ten to solve this problem!



# Refine Using Mental Math Strategies for Subtraction

## APPLY IT

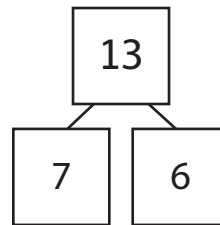
Solve the problems.

- 1 Javier has 12 eggs. He cooks 3 eggs for breakfast. How many eggs does Javier have left?

- (A) 15
- (B) 10
- (C) 9
- (D) 5

- 2 Which equations are in the fact family for this number bond?

- (A)  $7 + 6 = 13$
- (B)  $13 + 7 = 20$
- (C)  $13 - 7 = 6$
- (D)  $6 + 7 = 13$
- (E)  $13 - 6 = 7$



- 3 Could you make a ten to solve the problem? Choose *Yes* or *No* for each problem.

	Yes	No
$14 - 7$	(A)	(B)
$10 - 2$	(C)	(D)
$9 - 3$	(E)	(F)
$12 - 4$	(G)	(H)



- 4 Solve  $12 - 5 = ?$  by using a related addition fact. Show how you solved the problem.

**Solution** .....

- 5 Show a way that you could find  $16 - 9$ . Show your work.

**Solution** .....

6 **MATH JOURNAL**

What are two ways you can find  $17 - 8$ ? Explain.



**SELF CHECK** Go back to the Unit 1 Opener and see what you can check off.