

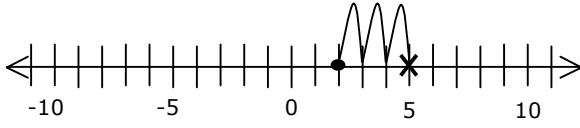
# Subtracting Integers

You may want to start with teaching the number line model (using I Do → We Do → You Do) and then teach the tile spacer model (again using I Do → We Do → You Do). Make sure to show students how to record the problems in their notebook.

## Introduction

1. Review with students what a *zero pair* is.
  - Use movement: one step to the left, one step to the right, you're back where you started.
  - Elevator: one floor up, one floor down, back where you started.
  - End by showing students on a number line as well as with tile spacers.
2. Teach students that adding a zero pair to any number does not change its value.
  - Ask students what is  $5 + 0$ .
  - Remind students of the value of a zero pair  $(+ -)$ .
  - Therefore, what is  $5 + (+ -)$ .
  - Continue to model that it doesn't matter how many  $(+ -)$  get added on  
 $5 + (+ -) + (+ -) + (+ -) \dots = 5$
  - You can model this on a number line also. Start at 5, add 1, then take 1 away, and see where you land.

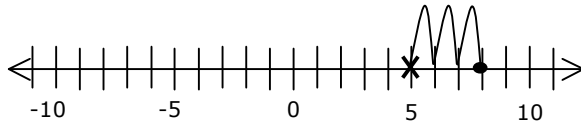
## Direct Instruction (I do)

Expression	Number line model	Tile spacer model
$5 - 3$	<p>Draw a number line from -10 to 10.</p> <p><i>Where am I starting?</i> [5]  <i>What's my operation?</i> [subtraction]  <i>In which direction should I go?</i> [left]  <i>How many?</i> [3]  <i>Where do I end up?</i> [2]</p> 	<p><i>I am starting with 5 positives, so I will draw my 5 positives.</i></p> <p style="text-align: center;">+ + + + +</p> <p><i>Am I adding or subtracting?</i>          [Subtracting]  <i>Subtracting positives or negatives?</i> [Positives]  <i>How many?</i> [3]  <i>Do I have 3 positives to take away?</i> [Yes]  <i>Then take them away.</i></p> <p style="text-align: center;">+ + <del>*</del><del>*</del><del>*</del></p> <p><i>What are you left with?</i> [Positive 2]</p>

$5 - (-3)$

Draw a number line from -10 to 10.

Where am I starting? [5]  
What's my operation? [subtraction]  
In which direction should I go when I subtract? [left]  
But I'm subtracting the opposite of 3. What happens? [I go in the opposite direction]  
In which direction should I now go? [right]  
How many? [3]  
Where do I end up? [8]



*I am starting with 5 positives, so I will draw my 5 positives.*

+ + + + +

*Am I adding or subtracting?*  
[Subtracting]

*Subtracting positives or negatives?* [Negatives]

*How many?* [3]

*Do I have 3 negatives to take away?* [No]

*The only way to add 3 negatives to what I already have (without changing my start value) is to add zero pairs.*

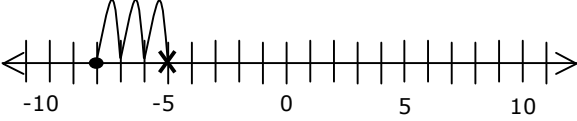
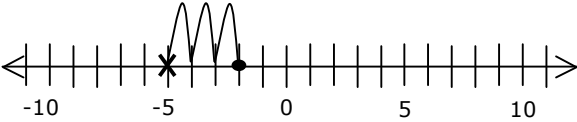
+ + + + + + + + +  
- - -

*Now do I have 3 negatives to take away?* [Yes]

*Then take them away.*

+ + + + + + + + +  
X X X

*What are you left with?* [Positive 8]

<p><math>-5 - 3</math></p>	<p>Draw a number line from -10 to 10.</p> <p>Where am I starting? [-5]          What's my operation? [subtraction]          In which direction should I go?          [left]          How many? [3]          Where do I end up? [-8]</p> 	<p><i>I am starting with 5 negatives, so I will draw my 5 negatives.</i></p> <p>-----</p> <p><i>Am I adding or subtracting?</i>          [Subtracting]  <i>Subtracting positives or negatives?</i> [Positives]          How many? [3]          Do I have 3 positives to take away? [No]          The only way to add 3 positives to what I already have (<u>without changing my start value</u>) is to add zero pairs.</p> <p>-----          + + +</p> <p><i>Now do I have 3 positives to take away?</i> [Yes]          Then take them away.</p> <p>-----          * * *</p> <p><i>What are you left with?</i> [Negative 8]</p>
<p><math>-5 - (-3)</math></p>	<p>Draw a number line from -10 to 10.</p> <p>Where am I starting? [-5]          What's my operation? [subtraction]          In which direction should I go when I subtract? [left]          But I'm subtracting the opposite of 3. What happens? [I go in the opposite direction]          In which direction should I now go? [right]          How many? [3]          Where do I end up? [-2]</p> 	<p><i>I am starting with 5 negatives, so I will draw my 5 negatives.</i></p> <p>-----</p> <p><i>Am I adding or subtracting?</i>          [Subtracting]  <i>Subtracting positives or negatives?</i> [Negatives]          How many? [3]          Do I have 3 negatives to take away? [Yes]          Then take them away.</p> <p>-----          * * *</p> <p><i>What are you left with?</i> [Negative 2]</p>

## Guided Practice (We do)

Expression	Number line model	Tile spacer model
$7 - 4$		$+++****$
$7 - (-4)$		$+++++****$
$-7 - 4$		$-----****$
$-7 - (-4)$		$-----****$

## You try

Expression	Number line model	Tile spacer model
$6 - 1$		$+++++*$
$6 - (-1)$		$+++++*+$
$-6 - 1$		$-----*$
$-6 - (-1)$		$-----*$

*Using these methods, students may discover some "rules" on their own for subtracting integers. Encourage them to prove why the rule will always work. (For example: Subtracting a negative number is the same as adding, or Adding a negative number is the same as subtracting.)*

### **Independent Practice**

$$-10 - (-4)$$

$$-4 - 6$$

$$-8 - (-8)$$

$$12 - (-4)$$

$$-1 - (-3)$$

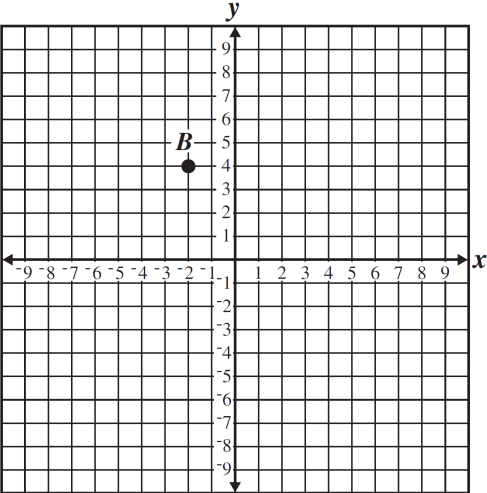
$$-6 + 3 - 7$$

$$4 - (-6) + 5$$

## Warm-Up: Subtracting Integers

Name: \_\_\_\_\_

Date: \_\_\_\_\_

CST	Review
<p><b>If <math>n = 31</math>, what is the value of <math>6 - n</math>?</b></p> <p><b>A</b>   <math>-37</math></p> <p><b>B</b>   <math>-25</math></p> <p><b>C</b>   <math>25</math></p> <p><b>D</b>   <math>37</math></p> <p>Write an expression for each of the incorrect answers.</p>	<p><b>Kira owes Mark \$5, and Mark owes Kira \$7. Which statement means the same thing?</b></p> <p><b>A</b>   Kira owes Mark \$2.</p> <p><b>B</b>   Kira owes Mark \$12.</p> <p><b>C</b>   Mark owes Kira \$2.</p> <p><b>D</b>   Mark owes Kira \$12.</p>
Current	Other
<p>Solve the following problem in two different ways.</p> <p style="text-align: center;"><math>-7 + 10</math></p>	<p>What is the ordered pair for point <math>B</math>?</p> <div style="text-align: center;">  </div> <p><b>A</b>   <math>(-4, 2)</math></p> <p><b>B</b>   <math>(-2, 4)</math></p> <p><b>C</b>   <math>(2, -4)</math></p> <p><b>D</b>   <math>(2, 4)</math></p>