6.4 Adding Integers That Are Far from Zero

You will need
- a number line

GOAL
Add integers with and without models.

Learn about the Math

Suppose you are asked to calculate (+35) + (−40) and you don't have enough counters.

? How can you add integers that are far from zero?

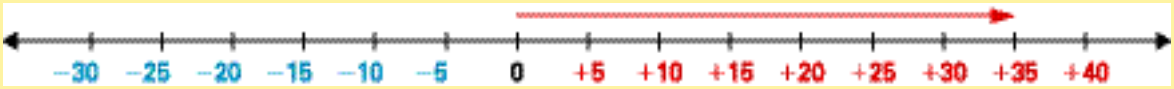
You can use a number line to model adding integers.

Example 1: Using a number line

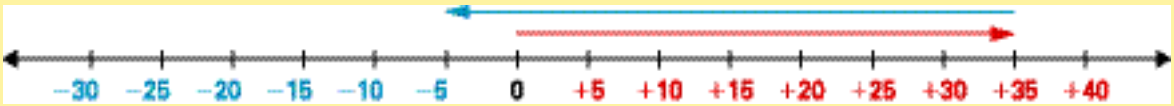
Add (+35) and (−40) using a number line model.

Bonnie's Solution

I think of (+35) as an increase in temperature from 0. I used a red arrow going from 0 to (+35) to represent (+35).



(−40) reminds me of a decrease in temperature. I represented (−40) with a blue arrow that started at (+35) and went left 40 spaces.



I ended up at (−5).
This means that (+35) + (−40) = (−5).

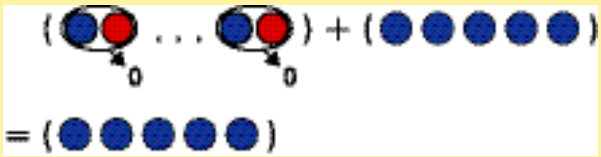
Example 2: Imagining using counters

Add (+35) and (−40) without using a model.

Fawn's Solution

I didn't have enough counters, so I imagined using 35 red counters to represent (+35) and 40 blue counters to represent (−40).

I know that (+1) + (−1) = 0 for each red/blue pair. There are 35 red/blue pairs.



There would be 5 blue counters left over.
This means that (+35) + (−40) = (−5).

Reflecting

1. Fawn used the zero principle to find the sum with counters. Explain how Bonnie also used the zero principle with her number line.

2. a) How would the counter model and number line model have to change to represent (−35) + (+40)?

b) How would the models have to change to represent (−35) + (−40)?

3. a) How can you predict whether the sum of two integers will be positive or negative, without adding the integers?

b) How can you find the sum of two integers without using a model?

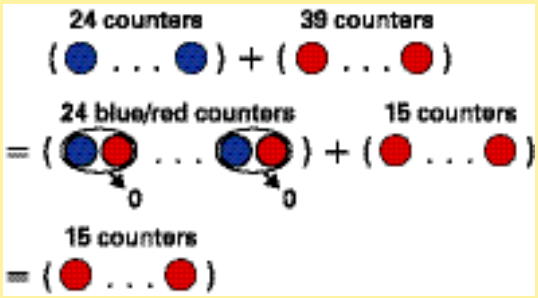
4. Imagine using counters to add (+35) + (−40). There will be more blue counters than red counters. How can knowing there will be more blue counters help you find the sum without using counters?

Work with the Math

Example 3: Adding integers with different signs

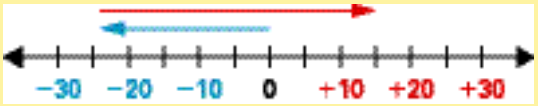
Add $(-24) + (+39)$.

Solution A: Using counters



The sum is $(+15)$.

Solution B: Using a number line



The sum is $(+15)$.

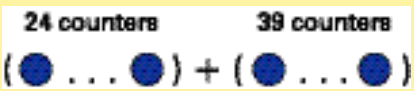
Solution C: Using logical reasoning

There are 15 more positives than negatives.
The sum is $(+15)$.

Example 4: Adding negative integers

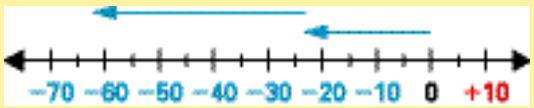
Add $(-24) + (-39)$.

Solution A: Using counters



The sum is (-63).

Solution B: Using a number line



The sum is (-63).

Solution C: Using logical reasoning

You are adding two negatives, so the sign of the answer will be negative.
Add $24 + 39$ to get the actual number. The sum is (-63).

A Checking

5. Use a number line to model the sum $(-27) + (+34)$.

a) Where does the first arrow start?

b) Where does the first arrow end?

c) Where does the second arrow start?

d) Where does the second arrow end?

e) What is the sum?

6. Think of how to use counters to model $(+39) + (-26)$.

a) How many counters of each type would you need?

b) How can you use the zero principle to find net results of 0?

c) How many counters will be left over?

d) What is the sum?

7. Calculate each sum without using a model.

a) $(-50) + (-20)$ **c)** $(-20) + (+50)$

b) $(-50) + (+20)$ **d)** $(-20) + (-50)$

B Practising

8. Add. Describe a counter model for each sum.

a) $(+5) + (+3)$ **d)** $(-10) + (-15)$

b) $(-5) + (-3)$ **e)** $(-15) + (+10)$

c) $(-4) + (-4)$ **f)** $(+11) + (-3)$

9. Add. Draw a number line model for each sum.

a) $(+5) + (-10)$ **d)** $(-10) + (+10)$

b) $(+10) + (-5)$ **e)** $(-30) + (-35)$

c) $0 + (-15)$ **f)** $(+35) + (-50)$

10. Find each sum.

a) $(-2) + (-5)$ **d)** $(+40) + (-70)$

b) $(-4) + (+5)$ **e)** $(-20) + (-50)$

c) $(-60) + (+20)$ **f)** $(+100) + (-80)$

11. How much greater is the second sum than the first sum? Show your work.

a) $(-25) + (+38)$ and $(-15) + (+38)$

b) $(+125) + (-52)$ and $(+125) + (-32)$

12. Is each statement always true? If you think that a statement is always true, explain why. If you think that a statement is not always true, provide an example of when it is false.

a) The sum of two negative integers is always negative.

b) The sum of a positive integer and a negative integer is always negative.

c) If the sum of two integers is zero, the integers must be opposites.

13. In this Magic Square, every row, column, and diagonal adds to 0. Copy and complete the square.

−1		+3
		−4

14. A hockey player's +/− score is determined by the goals scored while the player is on the ice. A goal for the player's team counts as +1. A goal against the player's team counts as −1. Order the players from highest to lowest +/− score.

Player	Goals for	Goals against
Heidi	110	94
Rana	103	89
Meagan	99	108
Sonya	105	97
Indu	101	102

15. Copy and complete the following table.

	Starting temperature (°C)	Temperature change (°C)	Final temperature (°C)
a)	−5	+1	
b)	−10	−6	
c)	0		−8
d)		−5	0
e)	+7		−2
f)		−10	+8

C Extending

16. This four-by-four Magic Square uses all the integers from −7 to +8. Copy and complete the square.

−7			
	−2		+1
		+3	
+6			

17. Make a four-by-four Magic Square in which each row, column, and diagonal adds to −2.

18. Ravi added $(+50) + (-30)$ and got $(+20)$. He noticed that this was like subtracting $50 - 30$. Describe when adding a negative number to a positive number works like subtracting.