

Student Name

Mathematics Stage 4

COMPUTATION WITH INTEGERS

Book 2 Add and subtract positive and negative integers

Version: 260207

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OVERVIEW

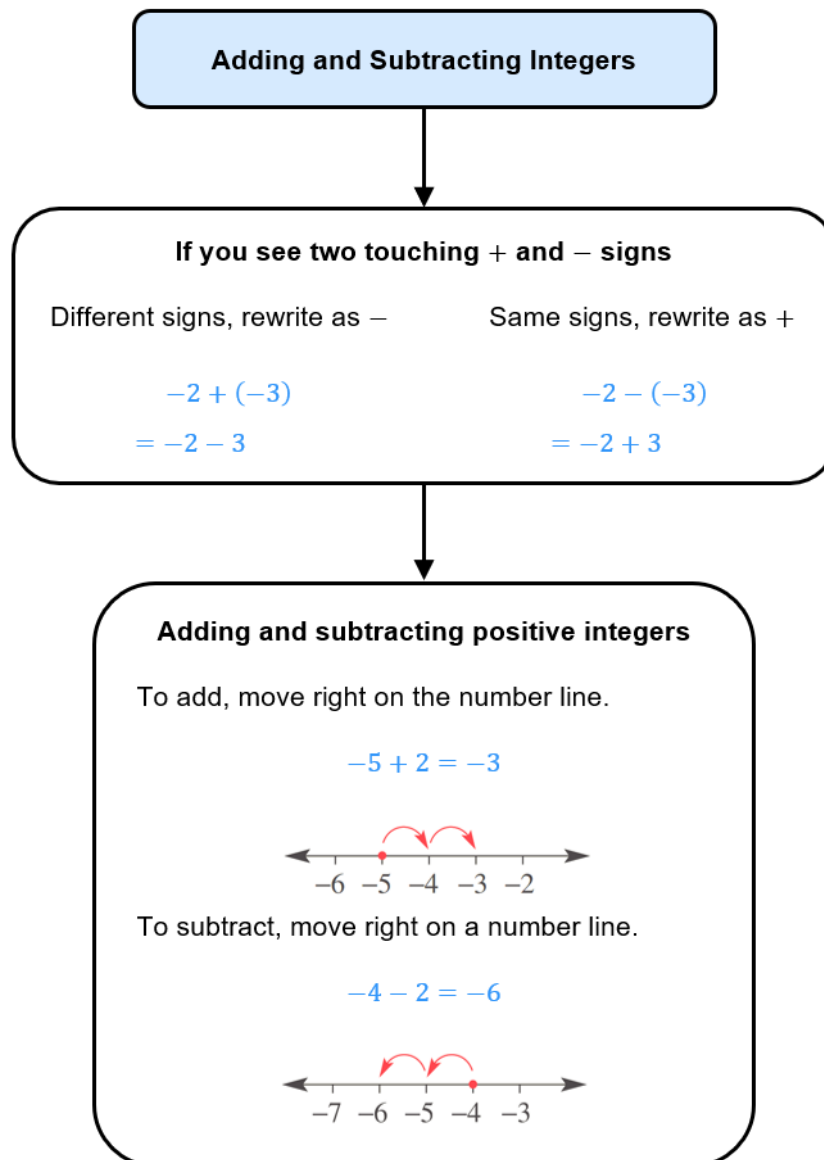
SYLLABUS CONTENT

MA4-INT-C-01 compares, orders and calculates with integers to solve problems

Add and subtract positive and negative integers

- Add and subtract integers with and without the use of digital tools
- Construct a directed number sentence to model a situation
- Examine different meanings (position or operation) for the + and - signs, depending on context

SUMMARY



REVIEW OF PRIOR KNOWLEDGE

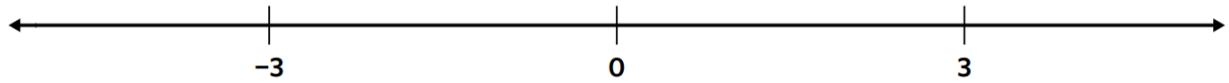
- 1 Determine the magnitude and direction of these numbers.

Integer	Magnitude	Direction
5		
-26		
-67		
+67		
-15		
	83	Positive
	83	Negative
	57	Negative
	412	Positive

OPPOSITE INTEGERS

- An **opposite** number has the same magnitude but different direction.

3 and -3 are opposites.



- Adding a number and its opposite always makes **zero**.

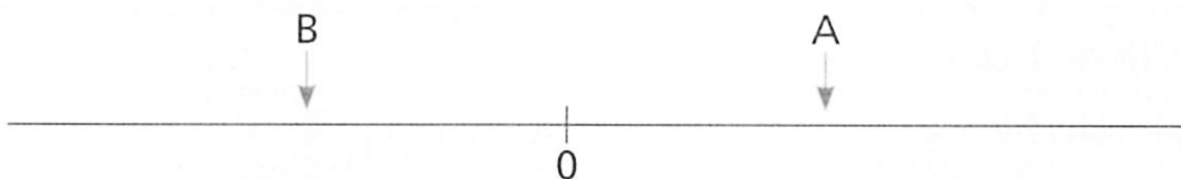
Example Identify the opposite of a number.

Integer	Opposite
4	-4
-4	4
$+4$	-4
92	-92
-41	41
35	-35
$+35$	-35
-82	82
-10	10
21	-21
-74	74

- 1 Complete these statements.

a $5 + (-5) = \dots\dots$ 0	b $3 + \dots\dots = 0$ -3	c $-7 + \dots\dots = 0$ 7	d $\dots\dots + (-4) = 0$ 4
e $\dots\dots + 2 = 0$ -2	f $7 + \dots\dots = 0$ -7	g $13 + \dots\dots = 0$ -13	h $0.5 + \dots\dots = 0$ -0.5

- 2 The number line has two numbers marked by arrows. Both numbers are the same distance from zero. A is the number 17.5.



- a** What number is B pointing to?

-17.5

- b** Explain how you know.

It is the same magnitude at 17.5, but opposite.

REPRESENTING INTEGERS AS COUNTERS

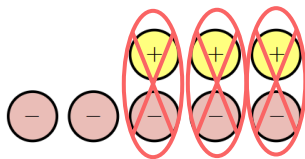
- Integers can be represented using counters.

$$\begin{aligned} \text{Yellow circle with } + &= 1 \\ \text{Red circle with } - &= -1 \end{aligned}$$

- Zero pair:** Opposite integers always make zero. For example, $+1$ and -1 make zero.

Example Represent integers using counters.

Determine the integer represented by these counters.

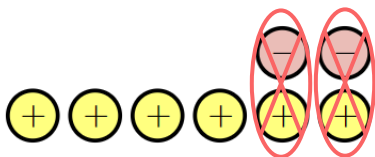


This set of counters represents -2

There are zero pairs and two counters left over, meaning the total is

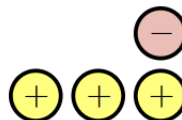
Determine the value represented by these diagrams.

a



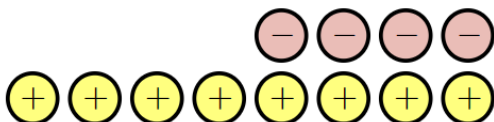
4

b



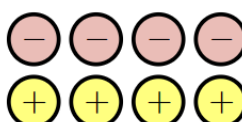
2

c



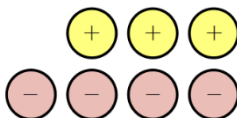
4

d



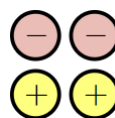
0

e



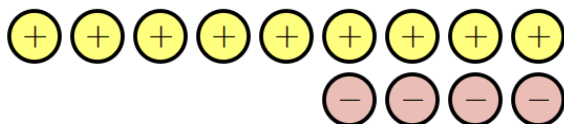
-1

f



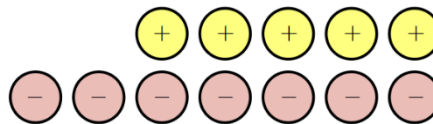
0

g



5

h



-2

Key ideas

- Opposite numbers have the same but different
- Opposite numbers always combine to make

1 What numbers are represented by these counters?



5

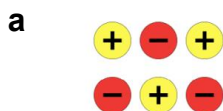


-5

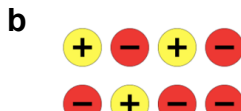


3

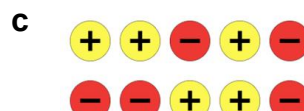
2 For each diagram, state the overall value represented by the counters.



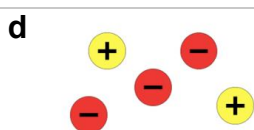
0



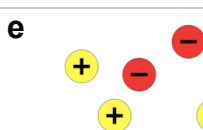
-1



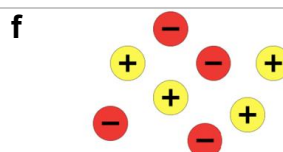
0



-1



1



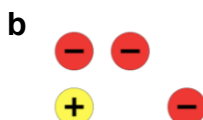
0

3 Add counters to each diagram below so they equal zero, then complete the equation.



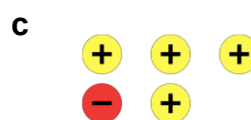
$$1 + \dots = 0$$

$$1 + (-1) = 0$$



$$-2 + \dots = 0$$

$$-2 + 2 = 0$$



$$3 + \dots = 0$$

$$3 + (-3) = 0$$



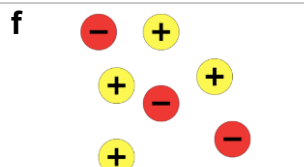
$$\dots + \dots = 0$$

$$-4 + 4 = 0$$



$$\dots + \dots = 0$$

$$-3 + 3 = 0$$



$$\dots + \dots = 0$$

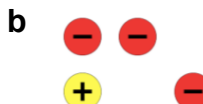
$$3 + (-3) = 0$$

4 Cross out counters from each diagram below so they equal zero, then complete the equation.



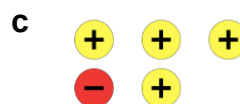
$$1 - \dots = 0$$

$$1 - 1 = 0$$



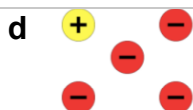
$$-2 - \dots = 0$$

$$-2 - (-2) = 0$$



$$3 - \dots = 0$$

$$3 - 3 = 0$$



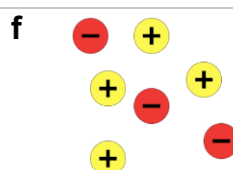
$$\dots - \dots = 0$$

$$-3 - (-3) = 0$$



$$\dots - \dots = 0$$

$$-2 - (-2) = 0$$



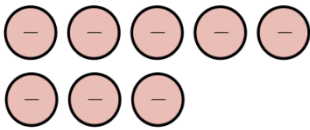
$$\dots - \dots = 0$$

$$1 - 1 = 0$$

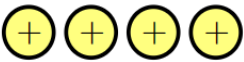
ADDING AND SUBTRACTING INTEGERS USING COUNTERS

- We can use counters to help us add and subtract integers.
 - The + operator means “add counters”
 - The – operator means “take away counters”
- The minus symbol “–” has two meanings:
 - An **operator** meaning subtract or take away.
 - A **negative**, indicating the direction of a number.
 - We place negative numbers in brackets to help us determine the meaning.

Example Use counters to add and subtract integers.

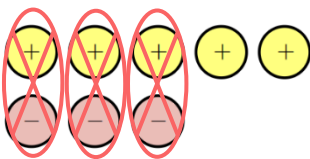
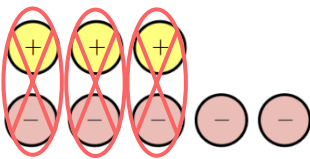
$(-5) + (-3)$  $(-5) + (-3) = -8$	Write the question in words: <i>Start with five counters.</i> <i>Add three counters.</i> <i>Together, we have (-1) counters.</i>
--	---

Represent these calculations with counters, then write the result of the calculation.

a $4 - 2$ Start with four (+1).  Take away two (+1). $4 - 2 = \dots\dots\dots$ 2	b $1 + (-3)$ Start with one.  Add three (-1).  $1 + (-3) = \dots\dots\dots$ -2
c $(-4) + 1$ Start with four Add $(-4) + 1 = \dots\dots\dots$ -3	d $(-1) + (-3)$ Start with one Add three $(-1) + (-3) = \dots\dots\dots$ -4
e $(-7) - (-2)$ -5	f $(-4) + (-2)$ -6
g $(-2) + (-3) + (-1)$ -6	h $(-1) + (-4) - (-3)$ -2

- Remember that opposite integers (+1) and (−1) make zero.

Example Use counters to add and subtract integers.

$5 + (-3)$  $5 + (-3) = 2$	Write the question in words: <i>Start with five counters.</i> <i>Add three counters.</i> <i>..... zero pairs cancel to make zero.</i> <i>We have (+1) counters left over.</i>
$3 + (-5)$  $3 + (-5) = -2$	Write the question in words: <i>Start with counters.</i> <i>Add counters.</i> <i>..... zero pairs cancel to make zero.</i> <i>We have counters left over.</i>

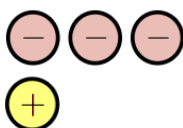
Represent these calculations with counters, then write the result of the calculation.

a $(-3) + 1$

Start with three (−1).

Add one (+1).

$(-3) + 1 = \dots\dots\dots$

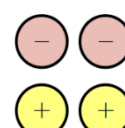


b $(-2) + 2$

Start with two (−1).

Add two (+1).

$(-2) + 2 = \dots\dots\dots$



c $(-4) + 2$

Start with four

Add

$(-4) + 2 = \dots\dots\dots$

d $(-5) + 4$

Start with five

Add four

$(-5) + 4 = \dots\dots\dots$

e $3 + (-2)$

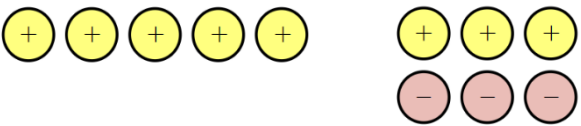
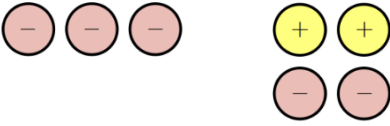
f $6 + (-2)$

g $3 + (-3)$

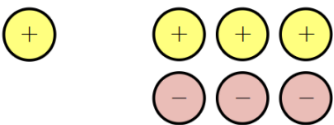
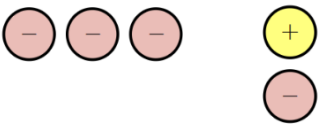
h $4 + (-3)$

- It is not possible to take away what doesn't exist. Sometimes we need to create zero pairs.

Example Use counters to add and subtract integers.

$5 - (-3)$  $5 - (-3) = 8$	Write the question in words: Start with five counters. Take away three counters. Do this by creating zero pairs. We have (+1) counters left over.
$-3 - (-5)$  $-3 - (-5) = 2$	Write the question in words: Start with three counters. Take away five counters. Do this by creating zero pairs. We have (+1) counters left over.

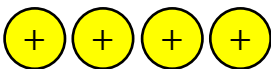
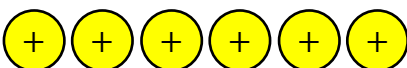
Represent these calculations with counters, then write the result of the calculation.

a $1 - 4$  Start with one (+1). Take away 4 (+1). Do this by creating zero pairs. $1 - 4 = \dots\dots\dots$ -3	b $(-3) - (-4)$  Start with three Take away four Do this by creating zero pairs. $(-3) - (-4) = \dots\dots\dots$ 1
c $6 - (-3)$ 9	d $4 - (-2)$ 6
e $1 - (-3)$ 4	f $-2 - (-4)$ 2

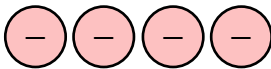
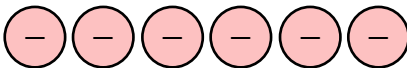
Key ideas

- The " + " operator means to The " - " operator means to
- cancel each other out to make zero.
- If we don't have enough counters to take away, create counters using

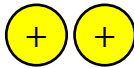
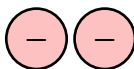
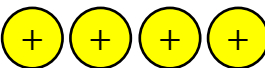
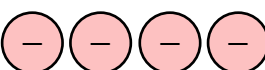
1 By taking away counters, evaluate the following.

- | | | | |
|----------|---|---------------|---|
| a |  | $(4) - (1) =$ | 3 |
| b |  | $(5) - (2) =$ | 3 |
| c |  | $(6) - (3) =$ | 3 |
| d |  | $(7) - (4) =$ | 3 |

2 By taking away counters, evaluate the following.

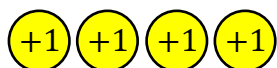
- | | | | |
|----------|---|-----------------|----|
| a |  | $(-4) - (-1) =$ | -3 |
| b |  | $(-5) - (-2) =$ | -3 |
| c |  | $(-6) - (-3) =$ | -3 |
| d |  | $(-7) - (-4) =$ | -3 |

3 By taking away counters, evaluate the following.

- | | | | |
|----------|--|----------------|---|
| a |  
 | $(3) - (-1) =$ | 4 |
| b |  
 | $(3) - (-2) =$ | 5 |
| c |  
 | $(3) - (-3) =$ | 6 |
| d |  
 | $(3) - (-4) =$ | 7 |
| e |  
 | $(3) - (-5) =$ | 8 |

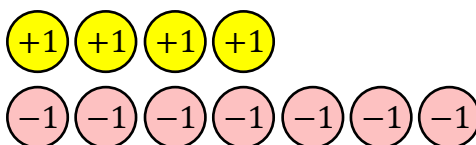
- 4 Consider the steps below then explain how counters can be used to work out $4 + (-7)$

Step 1:



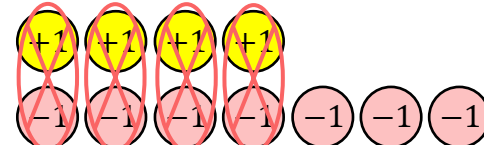
Start with 4 (+1) counters.

Step 2:



Add (-1) counters.

Step 3:



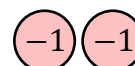
(+1) and (-1) make a zero pair and cancel each other out, so we are left with

-3

- 5 Beth is working out $5 + (-2)$. She has five positive counters.



She adds the two negative counters.



Determine the result and explain your reasoning.

.....

3, two zero pairs cancel out, so only 3 positive counters are left.

- 6 Using the counter model, determine the answer to the following:

a $6 + (-2)$

b $3 + (-7)$

c $(-3) + 6$

d $(-3) + (+6)$

e $(-4) + (-2)$

f $(-5) + (-2)$

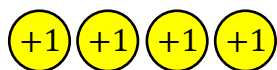
3

-6

-7

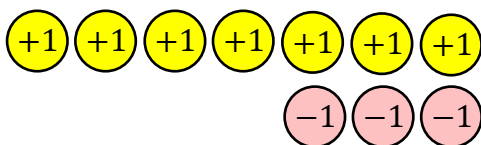
7 Consider the steps below then explain how counters can be used to work out $4 - (-2)$

Step 1:



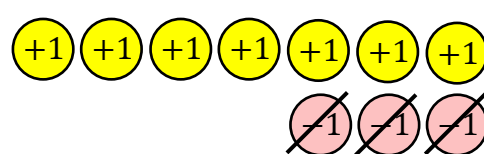
Start with 4 (+1) counters.
We need to subtract 3 (-1) counters, but we do not have any to subtract.

Step 2:



To subtract 3 (-1) counters we need to add in three zero pairs.
The zero pairs don't change the value of the original number.

Step 3:



We can now subtract three (-1) counters, and the result is

4

8 Christina is working out $3 - 6$.

She starts with three positive counters.



She wants to subtract six (+1) counters but do not have enough.

Explain what she needs to do to answer the problem.

.....

.....

.....

Create 3 more positive counters using three zero pairs. After removing 6 positive counters, she is left with -3.

9 Using the counter model, determine the answer to the following:

a $5 - 2$

b $5 - 7$

c $-2 - 7$

d $7 - (-2)$

e $-2 - (-6)$

f $3 - (-3)$

9

4

0

10 Draw the counter model to evaluate the two questions below:

5 − 2

5 + (−2)

−3

−3

What do you notice about the answers?
The answers are the same.

Complete the sentence: Adding a negative integer is the same as the positive
subtracting

11 Draw the counter model to evaluate the two questions below:

5 + 2

5 − (−2)

What do you notice about the answers?
The answers are the same.

Complete the sentence: subtracting a negative integer is the same as the positive
adding

12 Using the counter model, or otherwise, evaluate the following:

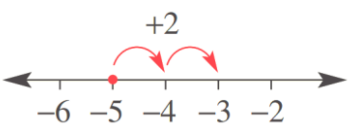
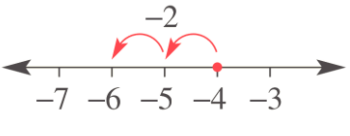
a 1 − 4	b 1 − (−3)	c (−3) − (−4)
−3	4	1
d (−2) − 4	e 6 − (−3)	f (−1) − 3
−6	9	−4
g 4 − (−2)	h 3 − 5	i (−6) + 2 − 9
6	−2	−13
j (−3) − (−6) + (−4)	k (−2) + 2 − (−8)	l (−3) + 5 − 6
−1	8	−4

13 What's a limitation of the counter model? Hint: consider $572 - (-2178)$.
.....
Too many counters to draw!

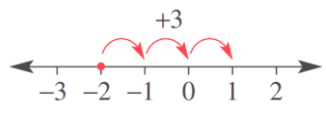
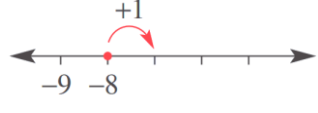
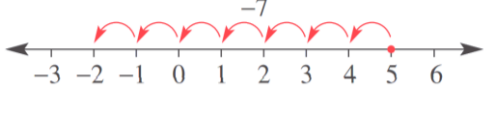
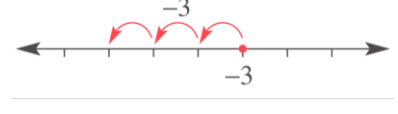
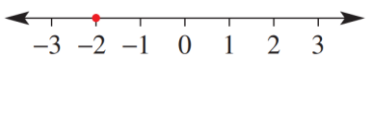
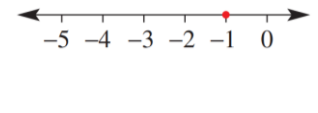
ADDING AND SUBTRACTING POSITIVE INTEGERS

- Adding and subtracting positive integers:
 - To add positive integers, move right on a number line. $-2 + 3 = 1$
 - To subtract positive integers, move left on a number line. $-2 - 3 = -5$

Example Add and subtract positive integers.

$-5 + 2$ $= -3$ 	To add integers on a number line, we move to the
$-4 - 2$ $= -6$ 	To subtract integers on a number line, we move to the

Complete these calculations using a number line.

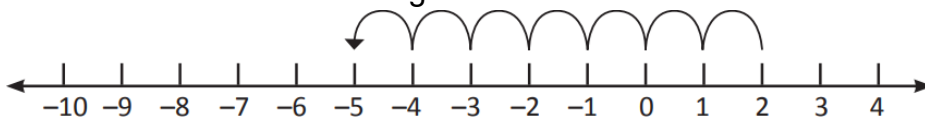
a $-2 + 3$ $=$ 	b $-8 + 1$ $=$ 
c $5 - 7$ $=$ 	d $-3 - 3$ $=$ 
e $-2 + 6$ $=$ 	f $-1 - 4$ $=$ 
g $-8 + 12$ $=$	h $13 - 21$ $=$

Key ideas

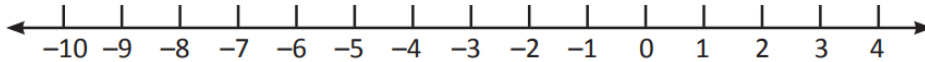
- Adding a positive number means to move on a number line.
- Subtracting a positive number means to move on a number line.
- To make calculations more efficient, partition to make pairs.

1 Use the number lines to add and subtract these integers.

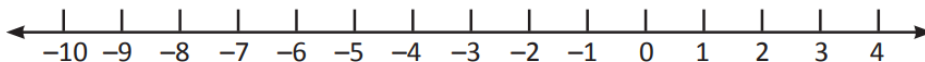
a $2 - 7 = \boxed{-5}$



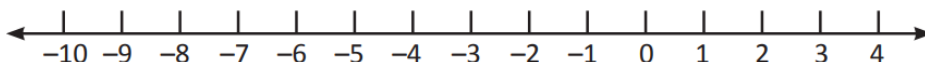
b $1 - 5 = \boxed{}$



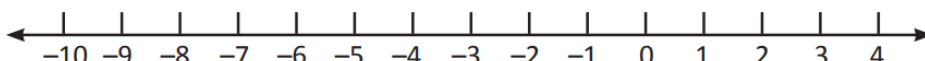
c $-4 + 7 = \boxed{}$



d $-6 + 3 = \boxed{}$



e $-1 - 7 = \boxed{}$



-4

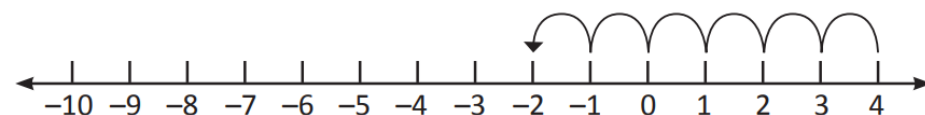
-3

-3

-8

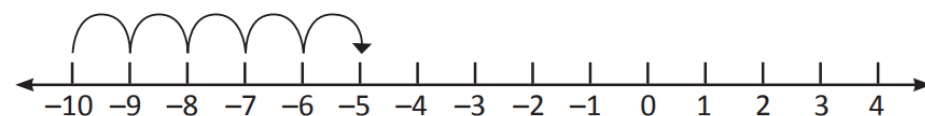
2 Write the operation shown by the number lines.

a $\boxed{} - \boxed{} = \boxed{-2}$



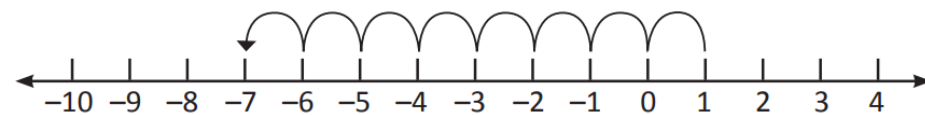
4 - 6

b $\boxed{} + \boxed{} = \boxed{-5}$



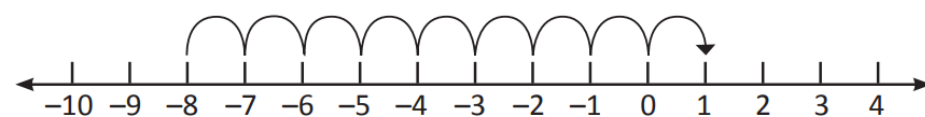
-10 + 5

c $\boxed{} - \boxed{} = \boxed{-7}$



1 - 8

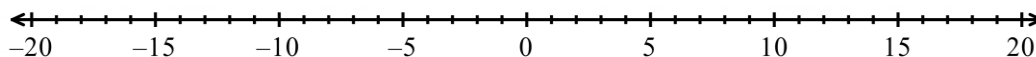
d $\boxed{} + \boxed{} = \boxed{1}$



-8 + 9

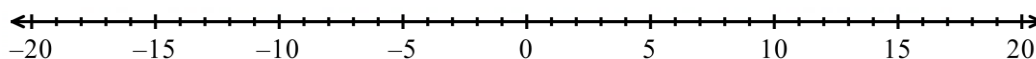
3 Solve each problem using the number line if needed.

a $-3 - 9$



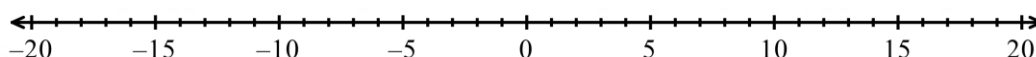
-12

b $-11 + 7$



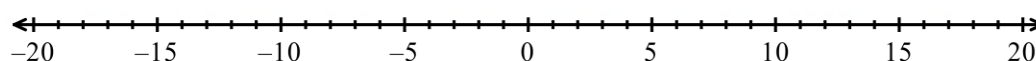
-4

c $-15 + 11$



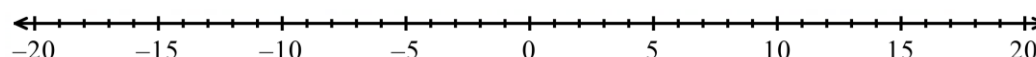
-4

d $10 - 4$



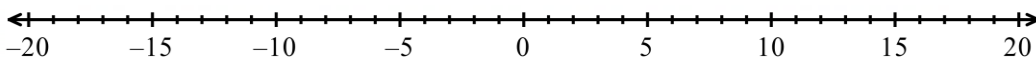
6

e $-2 + 5$



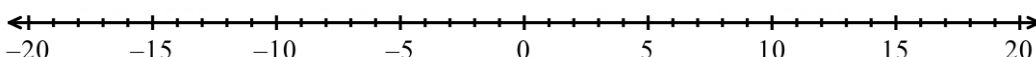
3

f $-2 + 15$



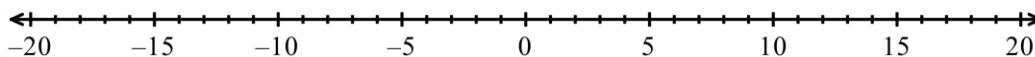
13

g $-3 - 9$



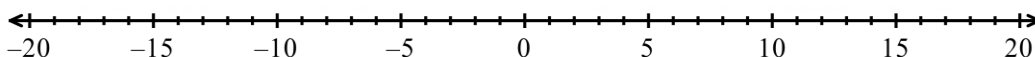
-12

h $1 - 7$



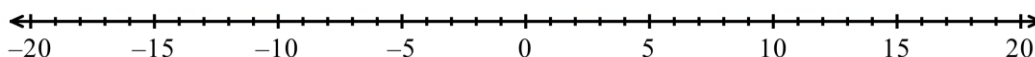
-6

i $-15 + 15$



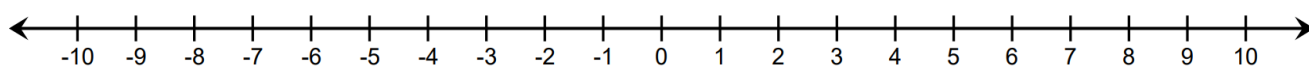
0

j $10 - 14$



-4

4 Use this number line to help you in the following questions.



a $-1 + 4 =$

e $7 - 8 =$

b $-10 + 11 =$

f $1 - 10 =$ -1

c $-5 + 2 =$

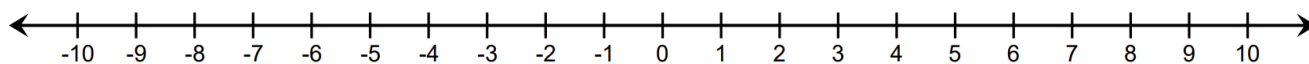
g $-5 - 5 =$ -9

d $-8 + 0 =$

h $-7 - 0 =$ -10

-8 -7

5 Evaluate the answer to the following:



a $2 - 7 - 4$

b $-5 - 7 - 1$

c $-1 - 4 + 6$

d $-3 + 2 - 7$ -13

-9 -8

6 Evaluate the following expressions.

a $-1 + 1$

g $-3 + 2$

m $-10 + 9$

b $-2 + 1$

h $-5 + 2$

n $-10 + 8$

c $-3 + 1$

i $-10 + 2$

o $-10 + 7$

d $-5 + 1$

j $-5 + 3$

p $-10 + 5$

e $-10 + 1$

k $-5 + 4$

q $-20 + 1$

f $-2 + 2$

l $-5 + 5$

r $-20 + 10$

7 Evaluate the following expressions.

a	$-5 - 1$	g	$-3 - 1$	m	$-10 - 10$
	-6		-4		-20
b	$-5 - 2$	h	$-3 - 4$	n	$-10 - 11$
	-7		-7		-21
c	$-5 - 3$	i	$-3 - 7$	o	$-100 - 10$
	-8		-10		-110
d	$-3 - 5$	j	$-3 - 10$	p	$-100 - 11$
	-8		-13		-111
e	$-3 - 3$	k	$-3 - 13$	q	$-100 - 110$
	-6		-16		-210
f	$-3 - 2$	l	$-3 - 15$	r	$-100 - 1100$
	-5		-18		-1200

8 Evaluate the following expressions.

a	$-5 + 6$	g	$-5 + 7$	m	$-5 + 9$
	1		2		4
b	$-3 + 4$	h	$-3 + 5$	n	$-3 + 7$
	1		2		4
c	$-4 + 5$	i	$-4 + 6$	o	$-4 + 8$
	1		2		4
d	$-2 + 3$	j	$-2 + 4$	p	$-2 + 6$
	1		2		4
e	$-2 + 2$	k	$-3 + 3$	q	$-4 + 4$
	0		0		0
f	$-5 + 6$	l	$-5 + 8$	r	$-5 + 9$
	1		3		4

9 Minh had a balance of \$300 owing on his credit card. He recently paid off \$120.

a Explain why this scenario can be modelled by the expression $-300 + 120$

.....

Owing money is negative, so -300 .

b Find Minh's new credit card balance.

-180

10 Todd enters the elevator at the carpark 4 floors below ground. He goes up 8 levels to his office. Write an integer addition to find the level his office is at.

.....

11 Calculate the answer without a number line.

a $6 - 9$

-3

b $8 - 9$

-1

c $5 - 8$

-3

d $5 - 6$

-1

e $7 - 8$

-1

f $6 - 8$

-2

g $1 - 7$

h $1 - 9$

i $2 - 7$

j $2 - 3$

k $3 - 5$

l $3 - 8$

m $4 - 8$

-6

n $5 - 7$

-8

o $5 - 8$

-5

p $7 - 8$

-1

q $5 - 10$

-2

r $3 - 17$

-5

-4

-2

-3

-1

-5

-14

12 Circle the calculations that will have an answer less than 0.

$2 - 8$

$3 - 5$

$1200 - 500$

$140 - 165$

$11 - 63$

$16.67 - 13.45$

$2 - 8$ | $3 - 5$ | $140 - 165$ | $11 - 63$

Explain your reasoning.

.....

.....

When subtracting a larger number from a smaller number, the answer will be negative.

13 The table shows the temperature in the Snowy Mountains at different times during one day.

12 midnight	3 a.m.	6 a.m.	9 a.m.	12 noon	3 p.m.	6 p.m.	9 p.m.
							
-6°C	-7°C	-7°C	-3°C	2°C	8°C	6°C	3°C

a By how many degrees does the temperature rise between midnight and noon?

8°C

b By how many degrees does the temperature rise between 6 a.m. and noon?

9°C

c Explain what happens to the temperature during the day.

.....

It gradually increases

d The temperature falls by 6 degrees from 9 p.m. to 12 midnight the next day.
What is the temperature at 12 midnight on the next day?

.....

$3 - 6 = -3^{\circ}\text{C}$

14 Fill in the missing number.

a	$2 + \square = 7$	b	$-2 + \square = 3$	c	$5 - \square = 0$	d	$-9 - \square = -12$
	5		5		5		3
e	$-2 + \square = 7$	f	$-4 + \square = -2$	g	$3 - \square = -4$	h	$-20 - \square = -30$
	9		2		7		10

15 You owe \$350 to your older sister. You recently earned \$420 and paid back the debt. By writing an integer addition, find how much money you have left.

.....

$-350 + 420 = 70$

16 A sample of liquid helium has a temperature of -300°C . The temperature needs to increase by 31°C to turn into gas. Find this temperature.

.....

$-300 + 31 = -269$

17 Determine how much debt remains in these financial situations.

- a Mr Ding owes the bank \$450 and pays back \$400.
 $(-450) + 400 =$
 $-\$50$
- b Mr Ding owes \$20 and borrows another \$35
.....
 $-\$55$
- c Mr Ding owes \$21500 and pays back \$16250
.....
 $-\$5250$

18 An ocean sensor is raised and lowered to different depths in the sea. Note that -100 metres means 100 metres below sea level.

- a If the sensor is initially at -100 metres and then raised by 41 metres, what is its new position?
.....
 -59
- b If the sensor is initially at -37 metres and then lowered another 60 metres, what is its new position?
.....
 -97

19 Fill in the missing number.

a $-6 + \square = -1$ 5	b $\square + 1 = -3$ -4	c $\square - 4 = -10$ -6	d $\square + 6 = -24$ -30
e $-8 - \square = -24$ 16	f $\square + 7 = 2$ -5	g $\square - 7 = -20$ -13	h $\square - 100 = -213$ -113

20 NAPLAN C

Murray lives in Bundaberg where the temperature on a particular day was 39°C .

Murray's son lives in Salt Lake City and on the same day the temperature there was -15°C .

What was the temperature difference between the two towns on this day?

.....

.....

54°C

21 NAPLAN B+

Death Valley is the lowest point in the United States at -85 metres, which is below sea level.

King's Peak, also in the United States, is 4128 metres above sea level.

What is the difference, in metres, between Death Valley and King's Peak?

.....

.....

4213 m

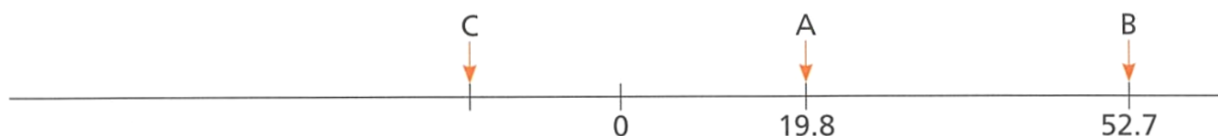
22 Work out the missing numbers,

a $7 - 4 - 9 = 7 - \square$ 13	b $2 - 8 - 3 = 2 - \square$ 11
c $-5 - 4 - 8 = -5 - \square$ 12	d $3 - 5 - 5 - 5 = 3 - \square$ 15

23 Work out the missing numbers.

a $\square - 12 = 4$ 16	b $\square - 12 = -4$ 8	c $12 - \square = 4$ 8	d $12 - \square = -4$ 16
a $7 - \square = 1$ 6	b $7 + \square = 1$ -6	c $\square - 7 = 1$ 8	d $\square + 7 = 1$ -6

24 Here is a number line.



The difference between A and B is the same as the difference between C and A.

Find the value of C.

-13.1

ADDING AND SUBTRACTING NEGATIVE INTEGERS

- To determine the rule for subtracting negative integers, we will do what mathematicians do: Look for a pattern, then come up with a rule.

Investigation Adding negative numbers.

$3 + 4 =$	$(-3) + 4 =$
$3 + 3 =$	$(-3) + 3 =$
$3 + 2 =$	$(-3) + 2 =$
$3 + 1 =$	$(-3) + 1 =$
$3 + 0 =$	$(-3) + 0 =$
$3 + (-1) =$	$(-3) + (-1) =$
$3 + (-2) =$	$(-3) + (-2) =$
$3 + (-3) =$	$(-3) + (-3) =$
$3 + (-4) =$	$(-3) + (-4) =$
$3 + (-12) =$	$(-3) + (-12) =$
$3 + (-29) =$	$(-3) + (-29) =$

Adding a negative number is the same as

Investigation Subtracting negative numbers.

$3 - 4 =$	$(-3) - 4 =$
$3 - 3 =$	$(-3) - 3 =$
$3 - 2 =$	$(-3) - 2 =$
$3 - 1 =$	$(-3) - 1 =$
$3 - 0 =$	$(-3) - 0 =$
$3 - (-1) =$	$(-3) - (-1) =$
$3 - (-2) =$	$(-3) - (-2) =$
$3 - (-3) =$	$(-3) - (-3) =$
$3 - (-4) =$	$(-3) - (-4) =$
$3 - (-12) =$	$(-3) - (-12) =$
$3 - (-29) =$	$(-3) - (-29) =$

Subtracting a negative number is the same as

REWRITING AS A SINGLE SIGN

- If you see touching signs, rewrite them as a single sign.
 - Different signs**, rewrite as **subtraction**.
 - Same sign**, rewrite as **addition**.

Example Rewrite addition & subtraction of negative integers as a single operation.

$5 + (-6)$ $= 5 - 6$	When you see a plus sign "+" and a minus sign "-" touching, rewrite as
$5 - (-6)$ $= 5 + 6$	When you see a "-" sign and a "-" sign touching, rewrite as

Rewrite these touching signs as a single calculation.

a $2 + (-3)$	b $10 + (-1)$	c $-5 + (-3)$
-1	9	-8
d $-6 - (-2)$	e $5 - (-1)$	f $-6 + (-2)$
-4	6	-8

Key ideas

- Adding a negative is the same as the positive.
- Subtracting a negative is the same as the positive.
- When you see two touching signs, always rewrite them as a sign.
- If the two signs are, rewrite as subtraction.
- If the two signs are, rewrite as addition.

1 Rewrite these as subtraction. **Do not evaluate the answer.**

a $28 + (-76)$
 $= 28 - 76$

b $-28 + (-76)$

c $76 + (-28)$

d $18 + (-76)$

e $-18 + (-76)$

f $76 + (-18)$

g $-76 + (-18)$

h $-77 + (-19)$

2 Rewrite these as addition. **Do not evaluate the answer.**

a $5 - (-3)$
 $= 5 + 3$

b $-5 - (-3)$

c $3 - (-5)$

d $-3 - (-5)$

3 Match the calculation on the left with a calculation on the right.

$9 - +3$

$9 - -3$

$9 + -3$

$-9 + 3$

$-9 - +3$

$-9 - -3$

$3 - 9$

$9 + 3$

$-9 - 3$

$9 + -3$

4 Fill in the table. If you see a single sign, rewrite as two signs.

Calculation	Rewritten
a $5 - 2$	$5 + (-2)$
b $4 - 3$	$4 + (-3)$
c $3 - (-2)$	$3 + 2$
d $2 - (-4)$	$2 + 4$
e $(-3) - 5$	$(-3) + (-5)$
f $(-2) - 3$	$(-2) + (-3)$
g $(-4) - 2$	$-4 + (-2)$
h $5 + (-2)$	$5 - 2$

Calculation	Rewritten
i $4 + (-3)$	$4 - 3$
j $(-5) + 3$	$-5 - (-3)$
k $-2 + 1$	$-2 - (-1)$
l $3 + (-4)$	$3 - 4$
m $2 + (-5)$	$2 - 5$
n $(-3) + 4$	$-3 - (-4)$
o $(-2) - (-1)$	$-2 + 1$
p $(-3) - (-4)$	$-3 + 4$

ADDING AND SUBTRACTING NEGATIVE INTEGERS

1. If you see two touching + or – signs:

- Different signs, rewrite as subtraction.
- Same signs, rewrite as addition.

$$-2 + (-3) = -2 - 3$$

$$-2 - (-3) = -2 + 3$$

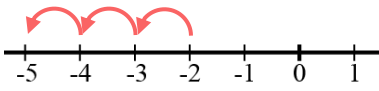
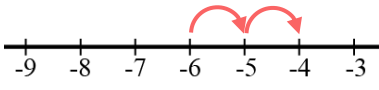
2. Adding and subtracting positive integers:

- To add positive integers, move right on a number line.
- To subtract positive integers, move left on a number line.

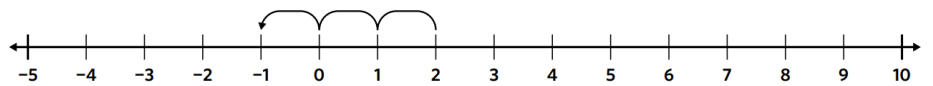
$$-2 + 3 = 1$$

$$-2 - 3 = -5$$

Example Add and subtract negative integers.

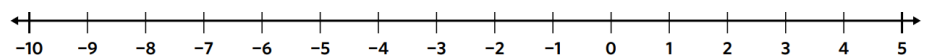
$-2 + (-3)$ 1. $= -2 - 3$ 2. $= -5$		How do you know when to rewrite touching signs as subtraction? <i>When the touching signs are , we rewrite as subtraction.</i>
$-6 - (-2)$ 1. $= -6 + 2$ 2. $= -4$		How do you know when to rewrite touching signs as addition? <i>When the touching signs are , we rewrite as addition.</i>

a $2 + (-3) = 2 \dots\dots 3$
 $= \dots\dots\dots$



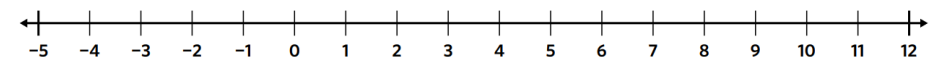
-1

b $-7 - (-3) = \dots\dots\dots$
 $= \dots\dots\dots$



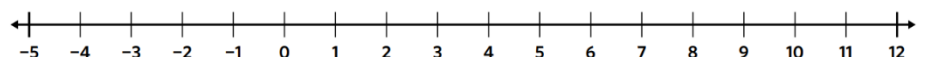
-4

c $10 + (-12) = \dots\dots\dots$
 $= \dots\dots\dots$



-2

d $-5 - (-3) = \dots\dots\dots$
 $= \dots\dots\dots$



-2

1 Complete the following

a $5 + (-1)$
 $= 5 \text{ } \underline{\hspace{1cm}} 1$
 $= 4$

b $6 - (-2)$
 $= \text{ } \underline{\hspace{1cm}} + \text{ } \underline{\hspace{1cm}}$
 $= \text{ } \underline{\hspace{1cm}}$

c $-2 + (-3)$
 $= -2 - \text{ } \underline{\hspace{1cm}}$
 $= - \text{ } \underline{\hspace{1cm}}$

8

-5

2 Rewrite these questions with a single plus or minus symbol and calculate the answer.

a $5 + (+1)$
 $= 5 + 1$
 $= \text{ } \dots\dots\dots$

b $1 - (-5)$

c $1 + (+5)$

6

6

6

d $5 - (-1)$

e $4 + (+5)$

f $5 + (+4)$

6

9

9

g $5 + (+3)$

h $3 + (+5)$

i $3 - (-5)$

8

8

8

j $5 - (-3)$

k $3 - (-3)$

l $3 + (+3)$

8

6

6

m $3 - (-9)$

n $3 + (+19)$

o $3 + (+29)$

12

22

32

p $3 - (-29)$

q $3 - (-99)$

r $3 + (+99)$

32

102

102

3 Rewrite these questions with a single plus or minus symbol and calculate the answer.

a $8 + (-4)$
 $= 8 - 4$
 $= \text{ } \dots\dots\dots$

b $8 + (-3)$

c $8 - (+3)$

4

5

5

d $8 - (+1)$

e $8 - (+5)$

f $8 + (-2)$

7

3

6

g $5 + (-2)$

h $5 - (+2)$

i $5 - (+5)$

3

3

0

4 Rewrite these questions with a single plus or minus symbol, then calculate the answer.

a $8 + (-3)$
 $= 8 - 3$
 $= \dots\dots\dots$

5

b $9 + (-7)$

2

c $6 + (-11)$

-5

d $0 + (-4)$

-4

e $0 + (-6)$

-6

f $-7 + (-15)$

-22

g $-28 + (-10)$

-38

h $-20 + (-9)$

-29

i $-13 + (-9)$

-22

j $5 - (-6)$

11

k $23 - (-11)$

34

l $-7 - (-4)$

-3

m $-41 - (-7)$

-34

n $-9 - (-10)$

1

o $-9 - (-14)$

5

p $28 - (-6)$

34

q $-14 - (-28)$

14

r $-9 - (-9)$

0

5 Here are some number cards.

-4

-10

+6

+5

+9

Use the cards to make these equations correct. You may reuse the cards.

a $\square + \square = 14$

+9, +5

b $\square - \square = 3$

+9, +6

c $\square + \square = -14$

-10, -4

d $\square - \square = -3$

+6, +9

e $\square - \square = 10$

6, -4

f $\square - \square = -1$

+5, +6

6 Here are some number and symbol cards.



Use three of the cards to make a calculation with an answer of 4. Find two different ways.

$$\boxed{} \boxed{} \boxed{} = 4$$

$$\boxed{} \boxed{} \boxed{} = 4$$

$-2 - -6$ or $+7 - +3$,
other combinations may be possible.

7 Work out the missing numbers.

a $-4 + \boxed{} = 3$
 $-4 - \boxed{} = 3$

$\begin{matrix} 7 \\ -7 \end{matrix}$

b $6 + \boxed{} = 1$
 $6 - \boxed{} = 1$

$\begin{matrix} -5 \\ 5 \end{matrix}$

c $-5 - \boxed{} = -8$
 $-5 + \boxed{} = -8$

$\begin{matrix} 3 \\ -3 \end{matrix}$

d $\boxed{} - 3 = -9$
 $\boxed{} + 3 = -9$

$\begin{matrix} -6 \\ -12 \end{matrix}$

8 Model each situation with a number sentence, then calculate the final position.

a From ground level, a lift went down 2 floors, then down another 3 floors.

b From ground level, a lift went down 3 floors, then up 5 floors, then down 4 floors.

-5

-2

c An Olympian dived 5 metres from a board 3 metres above water level. What is her position now?

d A submarine at sea level dived 50 metres, then dived another 26 m, then rose 32 metres.

-2

-44

e In Norway the highest recorded temperature is 35°C and the lowest is -26°C . What is the difference between temperatures?

f The lowest point in Japan is Lake Hachirogata at -4 m and the highest point is Mt Fujiyama at 3776 m. What is the height difference?

61

3780 m

9 Find the missing number

a $3 + \square = -7$

c $2 - \square = 7$

e $\square - (-2) = -3$

b $\square + (-10) = -11$

d $\square - (-10) = 12$

f $\square + (-5) = -1$

10 Find the missing numbers.

a $3 - \square = -6$

b $7 - \square = -1$

c $-8 + \square = -4$

d $\square - 10 = 3$

e $-4 - \square = -15$

f $-7 + \square = 7$

11 Find the missing numbers.

a i $8 + \square = 5$

ii $8 - \square = 5$

iii $8 + \square = 5$

iv $8 - \square = 5$

b i $20 + \square = 12$

ii $20 - \square = 12$

iii $12 + \square = 20$

iv $12 - \square = 20$

12 Complete the following.

a $17 + \square = 23$

b $17 + \square = -23$

c $-17 + \square = -23$

d $-17 + \square = 23$

e $\square + 24 = 18$

f $\square + 24 = -18$

g $\square - 24 = 18$

h $\square - 24 = -18$

i $5 + \square - 8 = -7$

j $5 + \square - 8 = 7$

k $-5 + \square - 8 = -7$

l $-5 + \square - 8 = 7$

m $5 + \square + 8 = -7$

n $5 + \square + 8 = 7$

o $-5 + \square + 8 = -7$

13 Complete these magic squares.
The columns, rows, and diagonals must sum to the same number.

a

-6		
	-1	
	-2	4

0, 3

8, -10

-5

b

-6		
	-2	
8		2

12, -12

-8, 4

-16

c

		-3
-17	6	-19

-1, -26

-12, -10, -8

- 14 Find two numbers which have:
- a a sum of -2 and a difference of 8.
 - b a sum of -6 and a difference of 12.
 - c a sum of 0 and a difference of 16.
 - d a sum of -8 and a difference of 2.

3, -5

-9, 3

8, -8

-3, -5

15 **NAPLAN A**

James runs a tyre fitting company.

At the beginning of February he took out a \$50 000 loan to expand his workshop.

In July James had flood damage in his workshop and added \$20 000 to his bank loan to pay for repairs.

By the end September he had made loan repayments totalling \$12 000 and had also deposited business profits of \$15 000 into his loan account.

Write a number sentence and use it to calculate how much James owed at the end of September.

-43 000

CHECK YOUR UNDERSTANDING

Adding and subtracting positive integers

1 $-6 + 6 =$

a -12

b 0

c 12

d -6

2 $-3 + 1 =$

a 2

b 4

c -2

d -4

3 $-8 + 3 =$

a -5

b -11

c 11

d -6

4 $18 - 30 =$

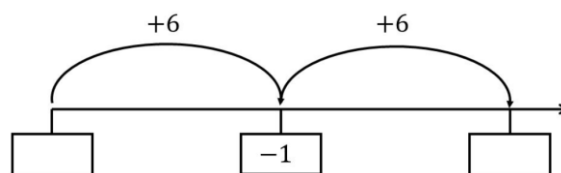
a -48

b -49

c -12

d -13

5 What are the two missing numbers?



a -5 and 5

b -7 and 5

c -7 and 6

d -5 and 7

6 The temperature drops from 8°C to -5°C . By how many degrees did it fall?

a 13

b 3

c 14

d 12

7 The temperature increases by 18°C to -3°C . What is the new temperature?

a 21°C

b -21°C

c 15°C

d -15°C

Adding and subtracting negative integers

1 $-2 - (-7) =$

a -9

b 5

c 9

d -5

2 $-8 + (-3) =$

a -11

b 11

c -5

d 5

3 $-8 - (-5) =$

a -13

b 13

c 3

d -3

4 $-5 + (-2) =$

a -7

b 7

c 3

d -3

5 Which of the following questions give the answer -15 ?

i $-8 - 7$

ii $-12 - (-3)$

iii $-20 + 5$

iv $-20 - 5$

a i, ii, and iii

b iv only

c i and iv

d i and iii