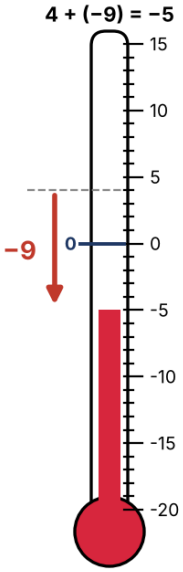
Fall Temperatures: Adding Integers

Positive and negative numbers on the thermometer and with counters (Grades 6–7)

Name: _____

1. The thermometer: adding means moving up or down

In October the days are still mild, but at night the temperature drops below zero. A thermometer is a number line standing up: numbers above 0 are positive, numbers below 0 are negative. Adding a positive number moves you UP the thermometer. Adding a negative number moves you DOWN.

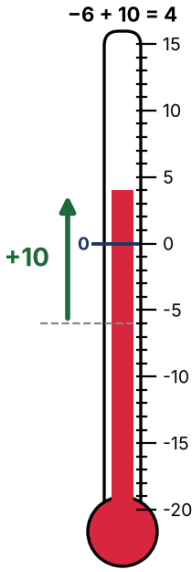


Example 1. At sunset it is 4 °C. Overnight the temperature drops 9 degrees. Start at 4 and go DOWN 9 steps: 4, 3, 2, 1, 0, −1, −2, −3, −4, −5.

4 + (−9) = −5

Example 2. At dawn it is −6 °C. The sun warms the air by 10 degrees. Start at −6 and go UP 10 steps: you pass 0 after 6 steps and climb 4 more.

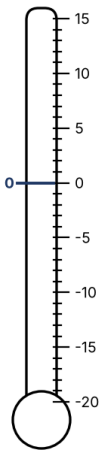
−6 + 10 = 4



Adding a positive number: go UP. Adding a negative number: go DOWN.
The sign of the answer tells you where you landed: above zero (+) or below zero (−).

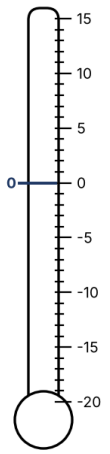
Try it. Draw the arrow on the thermometer, colour the mercury up to the answer, and write the sum.

1. 3 + (−8)



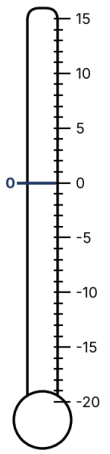
= _____

2. -4 + (+9)



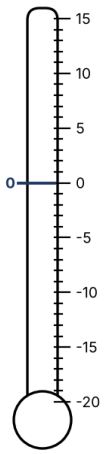
= _____

3. -2 + (−7)



= _____

4. 6 + (−11)

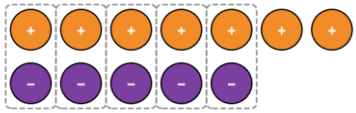


= _____

2. Counters: orange is +, purple is –

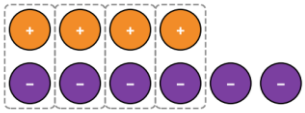
An **orange** counter is +1. A **purple** counter is −1. One orange and one purple together make 0 — a **zero pair**. Zero pairs cancel out: they add nothing. Whatever is left over is the answer.

−5 + 7



5 purple and 7 orange. Match them up: 5 zero pairs cancel. **2 orange are left, so −5 + 7 = 2.**

−6 + 4



6 purple and 4 orange. 4 zero pairs cancel. **2 purple are left, so −6 + 4 = −2.**

−3 + (−4)



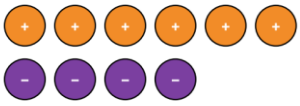
3 purple and 4 more purple. No orange, so nothing cancels. **7 purple: −3 + (−4) = −7.**

Different signs: make zero pairs. The answer is what is left, with the colour (sign) of the bigger pile.

Same signs: no pairs to cancel. Just count them all and keep the sign.

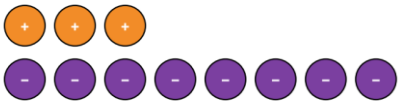
Try it. Circle the zero pairs, count what is left, write the sum.

1. −4 + 6 = _____



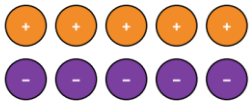
zero pairs: ____ left over: ____

2. −8 + 3 = _____



zero pairs: ____ left over: ____

3. −5 + 5 = _____



zero pairs: ____ left over: ____

4. −2 + 7 = _____



zero pairs: ____ left over: ____

Now draw your own counters (or just the leftovers) and write the sum:

5. −3 + 5 = ____	**6. 4 + (−6) = ____**	**7. −7 + 2 = ____**
8. −4 + (−3) = ____	**9. 6 + (−6) = ____**	**10. −9 + 4 = ____**

3. Practice

Think thermometer (up or down) or counters (zero pairs) — whichever you like. Write the answer.

1. 3 + (−5) = ____ **2.** −7 + 4 = ____ **3.** −2 + (−6) = ____ **4.** 8 + (−3) = ____

5. −9 + 9 = ____ **6.** −4 + 10 = ____ **7.** 5 + (−12) = ____ **8.** −6 + (−5) = ____

9. −1 + 7 = ____ **10.** 0 + (−8) = ____ **11.** −10 + 3 = ____ **12.** 7 + (−7) = ____

13. −3 + (−9) = ____ **14.** 12 + (−15) = ____ **15.** −8 + 14 = ____ **16.** −11 + (−4) = ____

17. 6 + (−20) = ____ **18.** −13 + 13 = ____ **19.** −5 + 2 + 4 = ____ **20.** −6 + 9 + 7 = ____

Check yourself: same signs → add the numbers, keep the sign. Different signs → find the difference, take the sign of the bigger number.

Example: −8 + 14 → different signs, difference 6, the bigger number (14) is positive → +6.
−3 + (−9) → same signs, 3 + 9 = 12, keep − → −12.

Which is colder? Circle the lower temperature in each pair:

−3 °C or −8 °C 2 °C or −1 °C −12 °C or −10 °C

0 °C or −4 °C −7 °C or 7 °C −15 °C or −5 °C

Crack the code

Work out the five sums. Find each answer in the code table and write its letter. Read the letters 1 to 5: what does the morning grass wear in late October?

1. −7 + 3 = _____ Letter: ____	**2.** 5 + (−11) = _____ Letter: ____	**3.** −9 + 9 = _____ Letter: ____	**4.** −2 + (−5) = _____ Letter: ____	**5.** −8 + 14 = _____ Letter: ____

−10	−7	−6	−4	−2	0	2	4	6
N	S	R	F	D	O	W	Y	T

4. Day and night across Canada

For each pair of cities, work out the new temperature (start + the change), colour both thermometers to that temperature, then compare the two cities.

1. Thanksgiving, October 12

Saskatoon, SK: afternoon 11 °C. By night the temperature dropped 13 degrees.

La Ronge, SK: afternoon 6 °C. By night the temperature dropped 11 degrees.

Saskatoon at night: _____ + (_____) = _____ °C

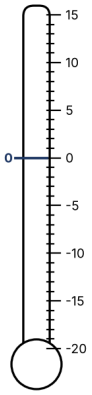
La Ronge at night: _____ + (_____) = _____ °C

Which city was colder at night? _____

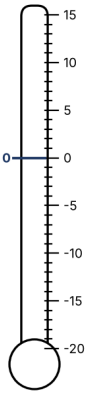
Which city had the bigger change? _____

How many degrees apart were the two cities at night? ____

Saskatoon



La Ronge



2. Halloween, October 31

Toronto, ON: afternoon 12 °C. By night the temperature dropped 7 degrees.

Winnipeg, MB: afternoon 3 °C. By night the temperature dropped 9 degrees.

Toronto at night: _____ + (_____) = _____ °C

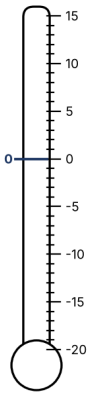
Winnipeg at night: _____ + (_____) = _____ °C

Which city was colder at night? _____

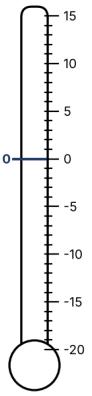
Which city had the bigger change? _____

How many degrees apart were the two cities at night? ____

Toronto



Winnipeg



3. November 20

Edmonton, AB: night -15 °C. By the afternoon the temperature rose 9 degrees.

Vancouver, BC: night 3 °C. By the afternoon the temperature rose 5 degrees.

Edmonton in the afternoon: _____ + (_____) = _____ °C

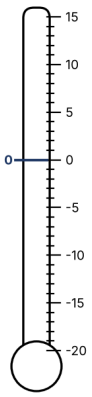
Vancouver in the afternoon: _____ + (_____) = _____ °C

Which city was colder in the afternoon? _____

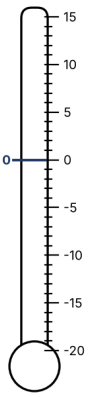
Which city had the bigger change? _____

How many degrees apart were the two cities in the afternoon? ____

Edmonton

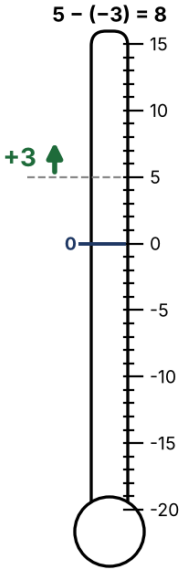


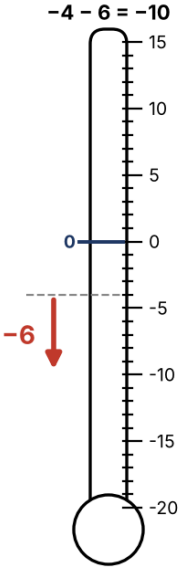
Vancouver

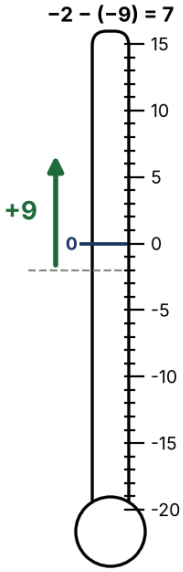


5. Subtraction on the thermometer

Start at the FIRST number. **Subtracting a positive number takes warmth away: go DOWN. Subtracting a negative number takes cold away: go UP.** Think of −3 as "3 degrees of cold". Taking away 3 degrees of cold makes it 3 degrees warmer.







5 − (−3) = 8. Start at 5. Take away 3 degrees of cold: go UP 3. You land on 8.

−4 − 6 = −10. Start at −4. Take away 6 degrees of warmth: go DOWN 6. You land on −10.

−2 − (−9) = 7. Start at −2. Take away 9 degrees of cold: go UP 9. You pass 0 and land on 7.

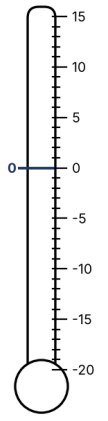
Check: is 8 really 3 more than 5? Yes. Is 7 really 9 above −2? Count on the thermometer: yes.

Subtract a positive → go DOWN. **Subtract a negative → go UP.**

Compare with adding: add a positive → go UP, add a negative → go DOWN. Subtracting is adding, turned around.

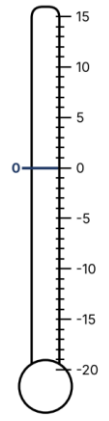
Try it. Mark the first number on the thermometer. Draw the arrow: down for subtracting a positive, up for subtracting a negative. Write where you land.

1. 6 − (-4)



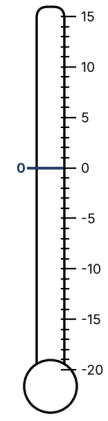
= _____

2. -3 − (5)



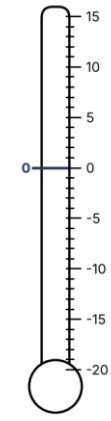
= _____

3. -7 − (-2)



= _____

4. 2 − (9)



= _____

6. Subtraction with counters: take away

Subtracting means taking counters away. Sometimes the counters you need are not there — then you add zero pairs first. A zero pair is worth 0, so adding one changes nothing.

5 − 2 = 3



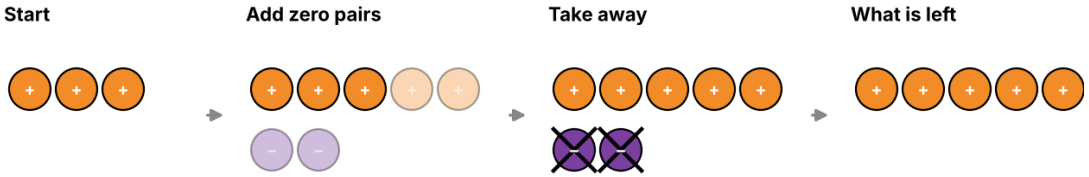
5 orange. Take away 2 orange. 3 orange are left.

−5 − (−2) = −3



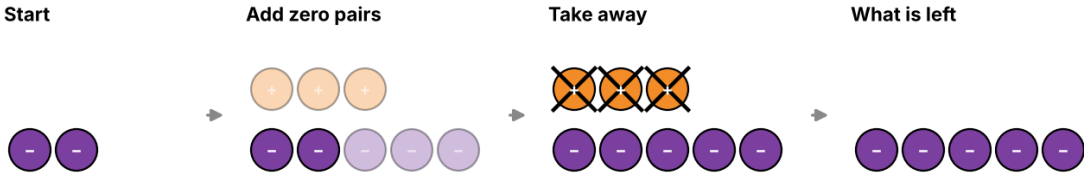
5 purple. Take away 2 purple. 3 purple are left: −3.

3 − (−2)



Start with 3 orange. We must take away 2 purple, but there are none. Add 2 zero pairs (2 orange + 2 purple: still worth 3). Now take away the 2 purple. **5 orange are left: 3 − (−2) = 5.**

−2 − 3

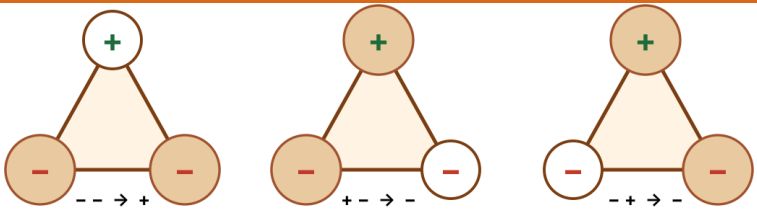


Start with 2 purple. We must take away 3 orange, but there are none. Add 3 zero pairs. Take away the 3 orange. **5 purple are left: −2 − 3 = −5.**

Look again. Taking away 2 purple left 2 more orange — the same as ADDING 2: so 3 − (−2) = 3 + 2. Taking away 3 orange left 3 more purple — the same as adding −3: so −2 − 3 = −2 + (−3).

Two signs side by side become ONE sign: − − → + + − → − − + → − + + → +

5 − (−3) = 5 + 3 = 8 4 + (−7) = 4 − 7 = −3 −2 − (−9) = −2 + 9 = 7



The sign triangle. Put + at the top and − in the two bottom corners. Cover the two signs from your problem with your fingers. The sign you can still see is the answer: cover − and −, you see +. Cover + and −, you see −.

Try it. Rewrite each subtraction as an addition, then solve. The first one is done.

Subtraction	Written as addition	Answer
8 − (−3)	8 + 3	11
−5 − 6		
−4 − (−9)		

7. Subtraction practice

Use the thermometer, the counters, or the rule "add the opposite" — your choice.

1. 7 − 10 = ____ **2.** −3 − 4 = ____ **3.** 5 − (−2) = ____ **4.** −6 − (−4) = ____

5. −1 − (−9) = ____ **6.** 0 − 7 = ____ **7.** −8 − 3 = ____ **8.** 4 − (−11) = ____

9. −5 − (−5) = ____ **10.** 12 − 15 = ____ **11.** −9 − (−12) = ____ **12.** −2 − 8 = ____

13. 6 − (−6) = ____ **14.** −10 − (−3) = ____ **15.** 3 − 14 = ____ **16.** −7 − (−20) = ____

17. 9 − (−9) = ____ **18.** −13 − 7 = ____ **19.** −4 + 1 − 3 = ____ **20.** 2 − (−5) − 10 = ____

8. Crack the code: what does November bring?

Work out the five subtractions, find each answer in the code table and write its letter. Read the letters 1 to 5.

1. −3 − 4 = _____ Letter: ____	**2.** 5 − (−4) = _____ Letter: ____	**3.** −8 − (−6) = _____ Letter: ____	**4.** 1 − 6 = _____ Letter: ____	**5.** −2 − (−9) = _____ Letter: ____

−9	**−7**	**−5**	**−2**	**1**	**2**	**5**	**7**	**9**
S	**W**	**D**	**N**	**K**	**R**	**T**	**Y**	**I**

9. Twins: find the matching pair

Every expression on the left has a twin on the right with the same value. Work out the left side, draw a line to its twin, and write the value. Then use the code table: the eight values, in order 1 to 8, spell what everyone in Saskatchewan is waiting for.

1. $-6 + 9$ = _____	•	• $-8 + 2$
2. $-6 - 9$ = _____	•	• $7 + (-12)$
3. $4 - (-7)$ = _____	•	• $9 - 6$
4. $4 + (-7)$ = _____	•	• $-7 + 4$
5. $-3 - (-3)$ = _____	•	• $-4 + 10$
6. $-8 - (-2)$ = _____	•	• $-9 + (-6)$
7. $10 - 4$ = _____	•	• $-3 + 3$
8. $7 - 12$ = _____	•	• $4 + 7$

−15	−12	−6	−5	−3	0	3	6	11	13
N	C	A	L	W	F	S	L	O	K

10. How much warmer, how much colder?

Mark both temperatures on the thermometer and draw the arrow from the second one to the first.

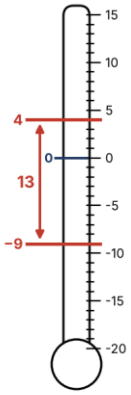
Then write the subtraction and the answer. A negative change means it got colder.

1. Prince Albert National Park, SK. Afternoon: 4 °C. Night: −9 °C. The two red lines show both temperatures. The arrow shows how many degrees it dropped.

afternoon − night:

_____ − (_____) = _____

Answer: _____

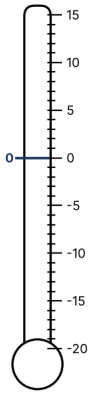


2. Cypress Hills, SK. Yesterday: −3 °C. Today: −11 °C. What is the change? Warmer or colder?

today − yesterday:

_____ − (_____) = _____

Answer: _____

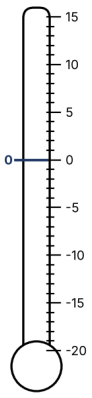


3. Lake Louise, Banff National Park, AB. Yesterday: −14 °C. Today: −6 °C. What is the change? Warmer or colder?

today − yesterday:

_____ − (_____) = _____

Answer: _____

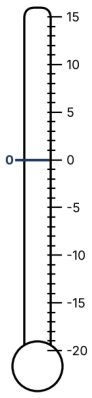


4. Algonquin Park, ON. Morning in the forest: −7 °C. Noon: 5 °C. How much warmer is it at noon?

noon − morning:

_____ − (_____) = _____

Answer: _____

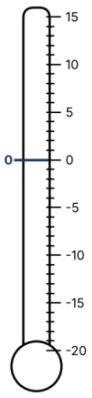


5. Riding Mountain National Park, MB. The air is −12 °C, but with the wind it feels like −21 °C. How many degrees colder does the wind make it feel?

air − feels like:

_____ − (_____) = _____

Answer: _____

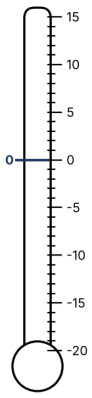


6. Lake Winnipeg, MB, has not frozen yet. The water is 2 °C. The air is −17 °C. How much warmer is the water than the air?

water − air:

_____ − (_____) = _____

Answer: _____



Answer Key (for the teacher)

1. Try it: 1. 3 + (-8) = -5 2. -4 + (9) = 5 3. -2 + (-7) = -9 4. 6 + (-11) = -5

2. 1. −4 + 6 = 2 (4 pairs, 2 orange left). 2. −8 + 3 = −5 (3 pairs, 5 purple left). 3. −5 + 5 = 0 (5 pairs, nothing left). 4. −2 + 7 = 5. Draw your own: 5. 2 6. −2 7. −5 8. −7 9. 0 10. −5.

3. 1. -2 2. -3 3. -8 4. 5 5. 0 6. 6 7. -7 8. -11 9. 6 10. -8 11. -7 12. 0 13. -12 14. -3 15. 6 16. -15 17. -14 18. 0 19. 1 20. 10. Colder: −8, −1, −12, −4, −7, −15.

Code: 1. −7 + 3 = -4 → F 2. 5 + (−11) = -6 → R 3. −9 + 9 = 0 → O 4. −2 + (−5) = -7 → S 5. −8 + 14 = 6 → T → FROST.

4. 1. Saskatoon 11 + (−13) = −2, La Ronge 6 + (−11) = −5; colder: La Ronge; bigger change: Saskatoon (13); 3 degrees apart. 2. Toronto 12 + (−7) = 5, Winnipeg 3 + (−9) = −6; colder: Winnipeg; bigger change: Winnipeg; 11 apart. 3. Edmonton −15 + 9 = −6, Vancouver 3 + 5 = 8; colder in the afternoon: Edmonton; bigger change: Edmonton (9); 14 degrees apart.

5. 1. 6 − (-4) = 10 2. -3 − (5) = -8 3. -7 − (-2) = -5 4. 2 − (9) = -7

6. 8 − (−3) = 8 + 3 = 11 −5 − 6 = −5 + (−6) = -11 −4 − (−9) = −4 + 9 = 5 2 − 7 = 2 + (−7) = -5

7. 1. -3 2. -7 3. 7 4. -2 5. 8 6. -7 7. -11 8. 15 9. 0 10. -3 11. 3 12. -10 13. 12 14. -7 15. -11 16. 13 17. 18 18. -20 19. -6 20. -3

8. 1. −3 − 4 = -7 → W 2. 5 − (−4) = 9 → I 3. −8 − (−6) = -2 → N 4. 1 − 6 = -5 → D 5. −2 − (−9) = 7 → Y → WINDY.

9. 1. −6 + 9 = 3 (twin: 9 − 6) → S 2. −6 − 9 = -15 (twin: −9 + (−6)) → N 3. 4 − (−7) = 11 (twin: 4 + 7) → O 4. 4 + (−7) = -3 (twin: −7 + 4) → W 5. −3 − (−3) = 0 (twin: −3 + 3) → F 6. −8 − (−2) = -6 (twin: −8 + 2) → A 7. 10 − 4 = 6 (twin: −4 + 10) → L 8. 7 − 12 = -5 (twin: 7 + (−12)) → L → SNOWFALL.

10. 1. 4 − (−9) = 13 degrees 2. −11 − (−3) = −8, colder by 8 3. −6 − (−14) = +8, warmer by 8 4. 5 − (−7) = 12 degrees 5. −12 − (−21) = 9 degrees 6. 2 − (−17) = 19 degrees