

Integers and Number Sets

Name: _____

Date: _____

Concepts

- Absolute Value Notation - Secondary 1, 2 and 3
- Adding and Subtracting Positive and Negative Numbers
- Integers ($\mathbb{Z}$)
- Multiplying and Dividing Positive and Negative Numbers
- Natural Numbers ($\mathbb{N}$)
- Number Sets - Secondary 1 and 2 (theory)
- Ordering Integers
- Ordering Natural Numbers
- Subtracting Integers

Absolute Value Notation — Secondary 1, 2 and 3

1. Five weather stations in the Saguenay report these overnight lows, in $^{\circ}\text{C}$:

-14 , 6 , -3 , 0 , 11 .

a) Evaluate $|-14|$, $|6|$ and $|-3|$.

b) Which reading is the farthest from 0°C , and which reading other than 0 is the closest to it? Say how you decided.

Adding and Subtracting Positive and Negative Numbers

2. Noah's bank account is overdrawn at the start of the week, so its balance is -35 dollars. During the week he deposits \$120 on Monday, spends \$48 on Tuesday, spends \$61 on Thursday and deposits \$44 on Friday. Find the balance at the end of the week, showing the running total after each transaction.

Integers ($\mathbb{Z}$)

3. Write one integer for each situation. Then give the opposite of that integer, and say what the opposite would mean in the same situation.

- a) A métro platform is 18 metres below street level.
- b) After one game, a hockey team's goal difference is 4 goals in its favour.
- c) Zoé owes the school store \$7 for a lost calculator.

Multiplying and Dividing Positive and Negative Numbers

4. Answer each part, showing the operation on integers that you used.

- a) A snowbank loses 4 cm of height on each of 9 mild days. Write this as a multiplication of integers and evaluate it.
- b) A drone descends steadily and, after 8 seconds, is 56 m below where it started. Write a division of integers that gives its change in height per second, and evaluate it.
- c) Evaluate $(-6) \times (-5)$, $(-72) \div 9$, $(-8) \times 3 \div (-4)$.

Natural Numbers ($\mathbb{N}$)

5. While organising a science fair, the committee writes down these numbers:

27, -3, 0, 4.5, 12, -8.

- a) Which of them are natural numbers?
- b) For each of the others, give the one reason it is not a natural number.

Number Sets — Secondary 1 and 2

6. Sort each of these numbers into exactly one of the three groups below:

15, -6, 0, 3.5, -20, $\frac{2}{5}$, -2.4

- a) a natural number;
- b) an integer that is *not* a natural number;
- c) not an integer at all.

Then complete this sentence and give a reason: “Every number in $\mathbb{N}$ is also in $\mathbb{Z}$, but ...”

Ordering Integers

7. A geologist records the position of six core samples relative to ground level, in metres:

$$-12, \quad 5, \quad -30, \quad 0, \quad -7, \quad 18.$$

- a) Place the six values on a number line and write them in order from least to greatest.
- b) Which sample is the deepest, and which sample is nearest to ground level?

Ordering Natural Numbers

8. Over five winters, a carnival counted these numbers of visitors:

$$3\,072, \quad 3\,720, \quad 3\,027, \quad 3\,702, \quad 3\,207.$$

- a) Write the five counts in order from greatest to least.
- b) Which count is closest to 3 500? Show the comparison you used.

Subtracting Integers

9. Answer both parts.

- a) The summit of a trail is 812 m above sea level, and the floor of a nearby sinkhole is 43 m below sea level. How much higher is the summit than the sinkhole floor? Write the subtraction of integers that answers this.
- b) Evaluate: $6 - 14$, $-9 - 5$, $-3 - (-11)$, $0 - (-8)$.

Synthesis — drawing on several sheets in this topic

10. Five checkpoints on a mountain-bike trail are labelled by their height in metres relative to the trailhead:

$$A = -18, \quad B = 25, \quad C = -40, \quad D = 0, \quad E = 12.$$

- a) Order the five checkpoints from lowest to highest.
- b) Which checkpoint is the farthest from the trailhead's height? Use absolute value to justify your choice.
- c) A rider goes from C to A , then from A to E . Write one expression, using subtraction of integers, that gives the total change in height for the whole ride, and evaluate it. Check your total a second way.

Want the harder problems and the worked solutions?

The *Challenge Problems* set and the *Answer Keys* for Integers and Number Sets — with the reasoning written out in full — are available at tutorinmontreal.ca.