

Integers and Rational Numbers: practice solutions, Grade 6 – download the PDF

Written solutions to the chapter problems. Check each step, then correct yourself.

1

Writing situations with signed numbers



Below, owing and losses are negative; above and gains are positive.

- a. **−12** feet.
- b. **+8** yards, or simply **8**.
- c. **−15** dollars.
- d. **+6** degrees, or **6**.

2

Finding opposites



The opposite changes the sign: **−9, 14, 0, 3.5, $-\frac{7}{8}$** . Zero is its own opposite.

3 Comparing integers



- a. $-5 < 3$: a negative number is less than a positive number.
- b. $-8 < -2$: -8 is farther left.
- c. $0 > -1$: zero is greater than any negative number.
- d. $4 > -10$.

4 Absolute values



The absolute value is the distance from zero: $|-9| = 9$, $|12| = 12$, $|0| = 0$, $|-2.5| = 2.5$,
 $|- \frac{3}{4}| = \frac{3}{4}$.

5 Reading a number line



Each tick is one unit. A is at -6 , B is at -2 , C is at 3 and D is at 7 .

6 Naming quadrants



Look at the signs. $(4, 7)$: both positive, quadrant I. $(-3, 5)$: quadrant II. $(-6, -1)$: quadrant III. $(2, -8)$: quadrant IV. $(0, 5)$: the x-coordinate is 0, so it is on the y-axis, in no quadrant.

7 True or false?



- a. True. An integer n can be written $\frac{n}{1}$.
- b. False. Zero is neither positive nor negative.
- c. True: $-(-7) = 7$.
- d. False. An absolute value is a distance, so $|-5| = 5$.

8 Ordering integers and decimals



- a. Negatives first, with the largest absolute value leftmost: $-7 < -3 < -1 < 0 < 2$.
- b. $-1.2 < -0.8 < 0.08 < 0.5$.

9 Fractions on the number line



- a. -0.75 , 0.5 and -1.25 . Order: $-\frac{5}{4} < -\frac{3}{4} < \frac{1}{2}$.
- b. With denominator 12: $-\frac{2}{3} = -\frac{8}{12}$ and $-\frac{3}{4} = -\frac{9}{12}$. Since $-9 < -8$, $-\frac{3}{4}$ is less.

10 A week of temperatures



- a. Coldest first: Tuesday (-9), Friday (-6), Monday (-4), Thursday (-1), Wednesday (2).
- b. Tuesday and Friday, since $-9 < -5$ and $-6 < -5$.
- c. $2 - (-9) = 11$. The temperature rose 11 degrees.

11 Money and debts



- a. She owes 45 dollars.
- b. $-45 + 30 = -15$. The balance is -15 dollars: she still owes 15 dollars.
- c. Owing 60 dollars is -60 and owing 35 dollars is -35 . Since $-60 < -35$, the first friend owes more.

12 Absolute value versus order



- a. $|-8| = 8 > 5 = |5|$, but $-8 < 5$.
- b. False. A larger absolute value only means farther from zero. -12 lies left of 7, so $-12 < 7$.
- c. $|-0.3| = 0.3$ and $|0.25| = 0.25$. Since $0.25 < 0.3$, the number **0.25** has the smaller absolute value.

13 Reading coordinates



A($-4, 3$) is in quadrant II. B($2, 5$) is in quadrant I. C($-5, -2$) is in quadrant III. D($3, -4$) is in quadrant IV.

14 Reflecting a point



Across the x-axis, change the sign of y: ($5, 2$). Across the y-axis, change the sign of x: ($-5, -2$). Across both: ($-5, 2$).

15 Submarine and seabird



- a. They are on opposite sides of sea level: $120 + 240 = 360$ feet.
- b. $-240 + 85 = -155$, so the submarine is at -155 feet. The distance is $120 + 155 = 275$ feet.
- c. $|-240| = 240$, so it must rise 240 feet.

16 Rectangle on the grid

- a. A and B share $x = -6$: $AB = 4 + 3 = 7$. B and C share $y = -3$: $BC = 6 + 5 = 11$.
- b. Perimeter: $2(7 + 11) = 36$ units. Area: $7 \times 11 = 77$ square units.

17 Walking across the map

- a. Library: $(3, 2)$. School: $(3, -2)$.
- b. Same y-coordinate: $3 + 3 = 6$ units, which is $6 \times \frac{1}{2} = 3$ miles.
- c. Library to school: same x-coordinate, $2 + 2 = 4$ units, so 2 miles. Total: $3 + 2 = 5$ miles.

18 Two reflections in a row

- a. First image: $(-7, -3)$. Second image: $(7, -3)$. The start is in quadrant II, the first image in quadrant III, the final image in quadrant IV.
- b. Both coordinates were changed to their opposites.
- c. $(-2.5, 4) \rightarrow (-2.5, -4) \rightarrow (2.5, -4)$.

19 Changing lake level

In quarters: -3 , $+6$, -9 , $+1$.

a. $-2\frac{1}{4} < -\frac{3}{4} < \frac{1}{4} < 1\frac{1}{2}$.

b. Week 3, with a drop of $2\frac{1}{4}$ inches.

c. $\frac{-3 + 6 - 9 + 1}{4} = -\frac{5}{4}$, so the lake fell $1\frac{1}{4}$ inches in all.

20 Reasoning with absolute value



- a. $-3, -2, -1, 0, 1, 2, 3$: seven integers.
- b. Those greater than -2 : $-1, 0, 1, 2, 3$, five integers.
- c. 6.5 and -6.5 .
- d. Being farther from zero on the negative side means being farther *left*, so -7 is less than -2 .

21 Missing vertex



- a. The fourth vertex shares x with the first and y with the third: $(-2, 3)$.
- b. Horizontal side: $2 + 4 = 6$. Vertical side: $1 + 3 = 4$. Perimeter $2(6 + 4) = 20$ units; area $6 \times 4 = 24$ square units.



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