

# Compute with Integers in Context

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 24

## Q Quick Review

Real situations are full of integers: temperatures, money, elevation, scores, and more. To solve a word problem, first decide which direction is **positive** and which is **negative**. Then translate the situation into an **integer expression** using addition, subtraction, multiplication, or division. Follow the **order of operations** — do multiplication and division before addition and subtraction. Finally, check that the sign of your answer makes sense in the story: a gain should be positive, a loss negative.

◇ **Example:** A hiker starts at an elevation of  $-200$  feet, then climbs 350 feet. What is the new elevation?

⇒ Let us set up the directions. Below sea level is negative, so the start is  $-200$  feet. Climbing means going *up*, the positive direction, so we add 350. The expression is  $-200 + 350$ . These have different signs, so subtract the absolute values:  $350 - 200 = 150$ , and the answer takes the sign of 350, which is positive. The new elevation is  $+150$  feet — above sea level, which makes sense after a big climb.

**Answer:** 150 feet

## PRACTICE

Write and evaluate an integer expression for each problem.

- |   |       |   |       |
|---|-------|---|-------|
| 1. Temp rises from $-6^\circ$ by $10^\circ$ | _____ | 11. Temp $-3^\circ$ drops $4^\circ$ each hr for 3 hr  | _____ |
| 2. Temp drops from $-4^\circ$ by $10^\circ$ | _____ | 12. Plane at 8000 ft descends 3500 ft                 | _____ |
| 3. Elevation $-200$ ft, climb 350 ft        | _____ | 13. Withdraw \$15 three times                         | _____ |
| 4. Diver at $-30$ ft descends 25 ft         | _____ | 14. Submarine $-150$ ft rises 60 ft                   | _____ |
| 5. Balance \$50, spend \$80                 | _____ | 15. Gain \$8 per day for 6 days                       | _____ |
| 6. Balance $-\$20$ , deposit \$35           | _____ | 16. Temp $-10^\circ$ rises $4^\circ$ each hr for 5 hr | _____ |
| 7. Owe \$25 to each of 4 friends            | _____ | 17. Lose 6 points in each of 7 rounds                 | _____ |
| 8. Share a $-\$60$ loss among 5 people      | _____ | 18. Debt of \$72 split among 8 people                 | _____ |
| 9. Score: lose 5, lose 8                    | _____ | 19. Climb 120 ft, then descend 200 ft                 | _____ |
| 10. Score: gain 12, lose 20                 | _____ | 20. Account $-\$30$ , add \$10 five times             | _____ |

## ◆ Word Problems

21. A football team loses 15 yards on one play, loses 8 yards on the next, then gains 30 yards. What is the team's total yardage change? \_\_\_\_\_
22. A delivery driver's gas tank loses 4 gallons of value each trip. After 12 trips, what is the total change in gallons? \_\_\_\_\_
23. A small business reports a total loss of \$300 spread evenly over 4 weeks. What was the change in money each week? \_\_\_\_\_
24. A scientist records a temperature of  $-7^\circ\text{C}$ , then it rises  $5^\circ\text{C}$  each hour for 3 hours. What is the final temperature? \_\_\_\_\_



## Answer Keys

- |                 |                       |
|-----------------|-----------------------|
| 1. $4^\circ$    | 13. $-\$45$           |
| 2. $-14^\circ$  | 14. $-90$ ft          |
| 3. $150$ ft     | 15. $\$48$            |
| 4. $-55$ ft     | 16. $10^\circ$        |
| 5. $-\$30$      | 17. $-42$             |
| 6. $\$15$       | 18. $-\$9$            |
| 7. $-\$100$     | 19. $-80$ ft          |
| 8. $-\$12$      | 20. $\$20$            |
| 9. $-13$        | 21. $+7$ yards        |
| 10. $-8$        | 22. $-48$ gallons     |
| 11. $-15^\circ$ | 23. $-\$75$           |
| 12. $4500$ ft   | 24. $8^\circ\text{C}$ |

### Step-by-Step Explanations

- |   |  |
|---|--|
| 1. $-6 + 10 = 4$ , so the temperature is $4^\circ$ .        | 14. $-150 + 60 = -90$ feet.  |
| 2. $-4 - 10 = -14$ , so the temperature is $-14^\circ$ .    | 15. $(8)(6) = 48$ , a total gain of $\$48$ .   |
| 3. $-200 + 350 = 150$ feet above sea level.                 | 16. $-10 + (4)(5) = -10 + 20 = 10^\circ$ .   |
| 4. $-30 - 25 = -55$ feet.                                   | 17. $(-6)(7) = -42$ points total.  |
| 5. $50 - 80 = -30$ , so the balance is $-\$30$ .            | 18. $-72 \div 8 = -9$ , so each share is $-\$9$ .  |
| 6. $-20 + 35 = 15$ , so the balance is $\$15$ .             | 19. $120 - 200 = -80$ feet, ending below the start.  |
| 7. $(-25)(4) = -100$ , a total debt of $\$100$ .            | 20. $-30 + (10)(5) = -30 + 50 = 20$ , a balance of $\$20$ .  |
| 8. $-60 \div 5 = -12$ , so each person's share is $-\$12$ . | 21. Losses are negative, the gain is positive: $-15 + (-8) + 30 = 7$ , a gain of 7 yards.          |
| 9. $-5 + (-8) = -13$ , a total change of $-13$ points.      | 22. Each trip is $-4$ gallons: $(-4)(12) = -48$ , a total change of $-48$ gallons.                 |
| 10. $12 - 20 = -8$ , a net change of $-8$ points.           | 23. A loss of $\$300$ is $-300$ . Divided over 4 weeks: $-300 \div 4 = -75$ , so $-\$75$ per week. |
| 11. $-3 + (-4)(3) = -3 + (-12) = -15^\circ$ .               | 24. Start at $-7$ and add the rise: $-7 + (5)(3) = -7 + 15 = 8^\circ\text{C}$ .                    |
| 12. $8000 - 3500 = 4500$ feet.                              |  |
| 13. $(-15)(3) = -45$ , a total change of $-\$45$ .          |  |



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