

# 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

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

### Step-by-Step Explanations

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