

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.

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|---|---|
| 1. Temp rises from -6° by 10° _____ | 11. Temp -3° drops 4° each hr for 3 hr _____ |
| 2. Temp drops from -4° by 10° _____ | 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° rises 4° 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°C , then it rises 5°C each hour for 3 hours. What is the final temperature? _____



Answer Keys

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| <p>1. <input type="text" value="4°"/></p> <p>2. <input type="text" value="-14°"/></p> <p>3. <input type="text" value="150 ft"/></p> <p>4. <input type="text" value="-55 ft"/></p> <p>5. <input type="text" value="-\$30"/></p> <p>6. <input type="text" value="\$15"/></p> <p>7. <input type="text" value="-\$100"/></p> <p>8. <input type="text" value="-\$12"/></p> <p>9. <input type="text" value="-13"/></p> <p>10. <input type="text" value="-8"/></p> <p>11. <input type="text" value="-15°"/></p> <p>12. <input type="text" value="4500 ft"/></p> | <p>13. <input type="text" value="-\$45"/></p> <p>14. <input type="text" value="-90 ft"/></p> <p>15. <input type="text" value="\$48"/></p> <p>16. <input type="text" value="10°"/></p> <p>17. <input type="text" value="-42"/></p> <p>18. <input type="text" value="-\$9"/></p> <p>19. <input type="text" value="-80 ft"/></p> <p>20. <input type="text" value="\$20"/></p> <p>21. <input type="text" value="+7 yards"/></p> <p>22. <input type="text" value="-48 gallons"/></p> <p>23. <input type="text" value="-\$75"/></p> <p>24. <input type="text" value="8°C"/></p> |
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Step-by-Step Explanations

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