

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° 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

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

Step-by-Step Explanations

- | | |
|---|--|
| 1. $-6 + 10 = 4$, so the temperature is 4° . | 14. $-150 + 60 = -90$ feet. |
| 2. $-4 - 10 = -14$, so the temperature is -14° . | 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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