Compute with Integers in Context

Name: _____	Date: _____	Score: _____ / 24

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 $10°$ _____
2. Temp drops from $-4°$ by $10°$ _____
3. Elevation -200 ft, climb 350 ft _____
4. Diver at -30 ft descends 25 ft _____
5. Balance $\$50$, spend $\$80$ _____
6. Balance $-\$20$, deposit $\$35$ _____
7. Owe $\$25$ to each of 4 friends _____
8. Share a $-\$60$ loss among 5 people _____
9. Score: lose 5, lose 8 _____
10. Score: gain 12, lose 20 _____
11. Temp $-3°$ drops $4°$ each hr for 3 hr _____
12. Plane at 8000 ft descends 3500 ft _____
13. Withdraw $\$15$ three times _____
14. Submarine -150 ft rises 60 ft _____
15. Gain $\$8$ per day for 6 days _____
16. Temp $-10°$ rises $4°$ each hr for 5 hr _____
17. Lose 6 points in each of 7 rounds _____
18. Debt of $\$72$ split among 8 people _____
19. Climb 120 ft, then descend 200 ft _____
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. 4°
2. -14°
3. 150 ft
4. -55 ft
5. $-\$30$
6. $\$15$
7. $-\$100$
8. $-\$12$
9. -13
10. -8
11. -15°
12. 4500 ft
13. $-\$45$
14. -90 ft
15. $\$48$
16. 10°
17. -42
18. $-\$9$
19. -80 ft
20. $\$20$
21. $+7$ yards
22. -48 gallons
23. $-\$75$
24. 8°C

Step-by-Step Explanations

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

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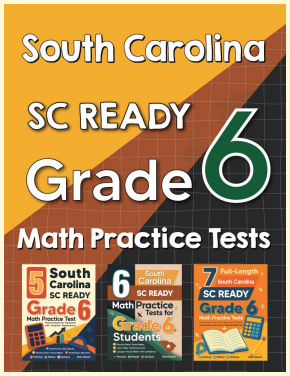

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