Equivalent Expressions in Context: Matching Word Problems to Algebra

Original tasks 1, 2, 3 / complete keys

Task 1

A jar starts with 18 marbles. Then m marbles are removed. Write an expression for the number of marbles remaining.

Answer: 18 - m

Reason: The starting amount is 18. Removing m marbles means subtracting m from 18. The remaining count is 18 - m.

Check: Test m = 5. Starting with 18 and removing 5 leaves 13. The expression 18 - 5 = 13. The match holds.

Task 2

A taxi charges a fixed fee of 3 dollars plus 2 dollars per mile. Write an expression for the total cost in dollars for a trip of d miles.

Answer: 3 + 2d

Reason: The fixed fee is 3 dollars. The mileage charge is 2 dollars for each of d miles, giving 2d dollars. The total cost is the sum 3 + 2d.

Check: Test d = 4. The mileage charge is 2 times 4 = 8 dollars, plus the 3-dollar fee gives 11 dollars. The expression 3 + 2(4) = 3 + 8 = 11. The match holds.

Task 3

A rectangle has length L and width 5. Write an expression for its perimeter.

Answer: 2L + 10 or 2(L + 5)

Reason: Perimeter is twice the length plus twice the width. Twice the length is 2L and twice the width is 10, so 2L + 10. Factoring gives 2(L + 5), which is equivalent.

Check: Test L = 6. The perimeter is 2(6) + 2(5) = 12 + 10 = 22. The expression 2(6 + 5) = 2(11) = 22. Both forms match.

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Original tasks 4 / complete keys

Task 4

A bag contains n nickels and 7 dimes. Write an expression for the total value in cents.

Answer: 5n + 70

Reason: Each nickel is worth 5 cents, so n nickels are worth 5n cents. Each dime is worth 10 cents, so 7 dimes are worth 70 cents. The total value in cents is 5n + 70.

Check: Test n = 3. Three nickels are 15 cents and seven dimes are 70 cents, giving 85 cents. The expression 5(3) + 70 = 15 + 70 = 85. The match holds.

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Source rubric / reflection

- [ ] Variable represents the correct unknown quantity.
- [ ] Operations match the scenario, including correct order for subtraction.
- [ ] Parentheses group sums or differences that are multiplied or divided.
- [ ] Units are consistent and stated where needed.
- [ ] Handwriting is legible; any valid letter style or spacing is accepted if the structure is clear.

Reflection: What did you check, what did you change, and what will you try next?