Terms, Factors, and Coefficients

Terms, factors, and coefficients: Mistakes and missing information

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QUICK REVIEW

Terms are parts that are added at the outermost level. A coefficient is a number multiplying a variable part, while a constant term has no variable. Factors are the parts being multiplied. In $5(p+2)$, 5 and $(p+2)$ are factors; after expanding, $5p+10$ has two terms.

Worked example

Identify the terms in $8t+11$. Give the coefficient of t and the constant term.

1. The outer sum joins $8t$ and 11, so those are the two terms.
2. In $8t$, the number 8 multiplies t. The term 11 has no variable.
Answer: Terms $8t$ and 11; coefficient 8; constant 11.

Practice Problems

Show your thinking.

1. Jordan counts 3, x, 5, and y as four terms of $3x+5y$. Correct the term count and tell what each listed part is.

2. Recover the missing coefficient c if $cx+4$ is 22 when $x=3$. Explain why 4 is not the coefficient.

3. A student says $6(a+2)$ has the same two outer terms as $6a+2$. Expand the first expression and identify the actual constant term after expanding.

4. A student calls 4 the coefficient of u in $11+\frac{u}{4}$. Rewrite the division as multiplication and correct the coefficient.

5. Reconstruct an expression by adding the variable term $2p$, the product of 3 and q, and the constant 9. Which two factors form the second variable term?

6. In $12+2xy$, Lena names $2x$ as the numerical coefficient of the variable part xy. Is that correct? Explain the difference between a factor and the numerical coefficient here.

Answer Key

1. Two terms, $3x$ and $5y$; $3, x$ and $5, y$ are the corresponding factor pairs.
2. $c = 6$; 4 is the constant.
3. $6a + 12$; constant 12.
4. $11 + \frac{1}{4}u$; coefficient $\frac{1}{4}$.
5. $2p + 3q + 9$; factors 3 and q.
6. No. The numerical coefficient on xy is 2; $2x$ is a factor if the term is grouped as $(2x)y$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The only top-level addition separates $3x$ from $5y$.
2. Each of those terms is a product: $3 \times x$ and $5 \times y$. Multiplying factors does not create more terms.

Problem 2

1. Substitute 3 for x: $3c + 4 = 22$.
2. Remove the constant 4: $3c = 18$. Then $c = 18 \div 3 = 6$.
3. Check: $6(3) + 4 = 22$; the 4 is added, not multiplied by x.

Problem 3

1. The original is a product with factors 6 and $(a + 2)$, not an outer sum.
2. Distribute to both inner terms: $6(a + 2) = 6a + 6(2) = 6a + 12$.
3. The variable-free term is 12, not 2.

Problem 4

1. Dividing u by 4 is the same as multiplying u by $\frac{1}{4}$.
2. The multiplier on u is therefore $\frac{1}{4}$. The added 11 remains the constant.

Problem 5

1. The product of 3 and q is the single term $3q$.
2. Add it to $2p$ and 9, keeping the three terms separate.

Problem 6

1. Isolate the whole variable part: $2xy = 2 \cdot (xy)$, so the multiplier with no variable is 2.
2. One can regroup the product as $(2x)y$, but $2x$ includes a variable and is not the numerical coefficient of xy.

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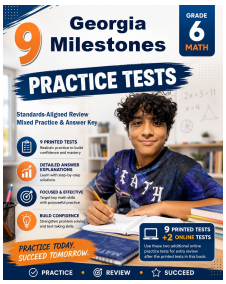

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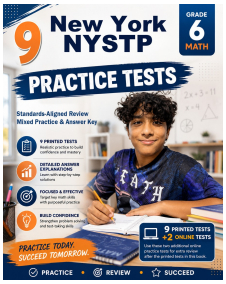

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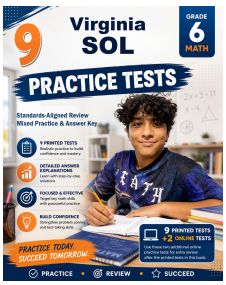

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