

Grade 7 Math – Art of Problem Solving

3.2 Adding and Subtracting Linear Expressions

Work in class. Show reasoning, examples, or diagrams that support your conclusions.

1. Reverse the order

Find $(5x - 8) - (2x + 1)$ and $(2x + 1) - (5x - 8)$. Add your results. Explain why that sum can be predicted without doing either subtraction.

2. Find the expression

Let $A = 3t - 7$. Find an expression B for which $A - B = 8t + 4$ is true for every t . Verify your choice by subtracting it, including all signs.

3. Two variables, two operations

Let $P = 2u + v + 5$ and $Q = u - 2v - 3$. Find $P + Q$ and $P - Q$. Explain why the coefficient of v changes differently in the two results.

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3.2 Adding and Subtracting Linear Expressions | Continued

Work in class. Show reasoning, examples, or diagrams that support your conclusions.

4. Can both be constant?

Create two nonconstant linear expressions whose sum is 12. Can two nonconstant linear expressions have both a constant sum and a constant difference? Explain using the coefficients of their variable terms.

5. Interpret a changing difference

Rae reads $(7d + 14)$ pages and Sam reads $(5d + 20)$ pages after d days. Write their total and the difference Rae minus Sam. Compare their page counts at $d = 2$ and $d = 5$. Explain the meaning of a negative difference.

6. Use every number

Place 1, 3, 6, and 8 in $(\square x + \square) - (\square x + \square)$, using each number exactly once. Find every placement that simplifies to $5x + 5$. Explain why your list is complete.