

### Exercise 3

Complete the computations in Exercises 1 to 4.

$$(8a, -2b, 13c) = (52, 12, 11) + \frac{1}{2}(?, ?, ?)$$

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#### Solution

Each pair of parentheses represents a vector, and commas separate the vector's components. Factors in front of parentheses are distributed to each component.

$$\frac{1}{2}(?, ?, ?) = \left(\frac{1}{2}?, \frac{1}{2}?, \frac{1}{2}?\right)$$

In adding or subtracting vectors, the respective components are added or subtracted. And when one vector is equal to another, the respective components are equal.

$$(8a, -2b, 13c) = (52, 12, 11) + \frac{1}{2}(?, ?, ?)$$
$$= \left(52 + \frac{1}{2}?, 12 + \frac{1}{2}?, 11 + \frac{1}{2}?\right) \Rightarrow \begin{cases} 8a = 52 + \frac{1}{2}? & \rightarrow ? = 2(8a - 52) \\ -2b = 12 + \frac{1}{2}? & \rightarrow ? = 2(-2b - 12) \\ 13c = 11 + \frac{1}{2}? & \rightarrow ? = 2(13c - 11) \end{cases}$$

Solving each equation for the question mark results in

$$(8a, -2b, 13c) = (52, 12, 11) + \frac{1}{2}(16a - 104, -4b - 24, 26c - 22).$$