

$$\begin{aligned}
 5b - (3 - 2b) + (4b - 6) &= -5b - \overbrace{3 + 2b}^{\text{signs changed}} + \underbrace{4b - 6}_{\text{signs not changed}} \\
 &= -5b + 2b + 4b - 3 - 6 \\
 &= b - 9
 \end{aligned}$$