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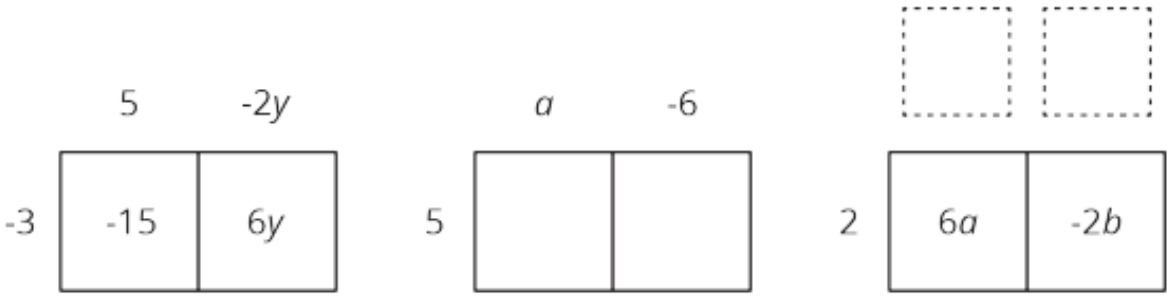
19.2: Factoring and Expanding with Negative Numbers

In each row, write the equivalent expression. If you get stuck, use a diagram to organize your work. The first row is provided as an example. Diagrams are provided for the first three rows.



factored	expanded
$-3(5-2y)$	$-15+6y$
$5(a-6)$	
	$6a-2b$
$-4(2w-5z)$	
$-(2x-3y)$	
	$20x-10y+15z$
$k(4-17)$	
	$10a-13a$
$-2x(3y-z)$	
	$ab-bc-3bd$
$-x(3y-z+4w)$	

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10.2: Analyzing Solution Methods

Three students each attempted to solve the equation $2(x-9)=10$, but got different solutions. Here are their methods. Do you agree with any of their methods, and why?

Noah's method:

$$\begin{aligned} 2(x-9) &= 10 \\ 2(x-9)+9 &= 10+9 && \text{add 9 to each side} \\ 2x &= 19 \\ 2x \div 2 &= 19 \div 2 && \text{divide each side by 2} \\ x &= \frac{19}{2} \end{aligned}$$

Elena's method:

$$\begin{aligned} 2(x-9) &= 10 \\ 2x-18 &= 10 && \text{apply the distributive property} \\ 2x-18-18 &= 10-18 && \text{subtract 18 from each side} \\ 2x &= -8 \\ 2x \div 2 &= -8 \div 2 && \text{divide each side by 2} \\ x &= -4 \end{aligned}$$

Andre's method:

I agree with _____

because:

$$\begin{aligned} 2(x-9) &= 10 \\ 2x-18 &= 10 && \text{apply the distributive property} \\ 2x-18+18 &= 10+18 && \text{add 18 to each side} \\ 2x &= 28 \\ 2x \div 2 &= 28 \div 2 && \text{divide each side by 2} \\ x &= 14 \end{aligned}$$

10.3: Solution Pathways

For each equation, try to solve the equation using each method (dividing each side first, or applying the distributive property first). Some equations are easier to solve by one method than the other. When that is the case, stop doing the harder method and write down the reason you stopped.

1. $2{,}000(x-0.03)=6{,}000$

2. $2(x+1.25)=3.5$

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3. $\frac{1}{4}(4+x)=\frac{4}{3}$

4. $-10(x-1.7)=-3$

Practice

1. Lin and Noah are solving the equation $7(x+2)=91$.
   Lin starts by using the distributive property. Noah starts by dividing each side by 7.

   a. Show what Lin's and Noah's full solution methods might look like.

   b. What is the same and what is different about their methods?

2. Solve each equation

   a. $2(x-3)=14$

   b. $\frac{1}{6}(x+6)=11$

   c. $3.2(x+10)=32$

   d. $-5(x-1)=40$

   e. $12(x+10)=24$

   f. $\frac{-1}{4}m+5=16$

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3. a. Expand to write an equivalent expression: $\frac{-1}{4}(-8x + 12y)$

   b. Factor to write an equivalent expression: $36a - 16$

4. Complete the equation with numbers that makes the expression on the right side of the equal sign equivalent to the expression on the left side.

$$75a + 25b = \_\_(\_\_a + b)$$

5. . Select **all** expressions that represent a correct solution to the equation $6(x + 4) = 20$.

   A. $(20 - 4) \div 6$
   B. $\frac{1}{6}(20 - 4)$
   C. $20 - 6 - 4$
   D. $20 \div 6 - 4$
   E. $\frac{1}{6}(20 - 24)$
   F. $(20 - 24) \div 6$