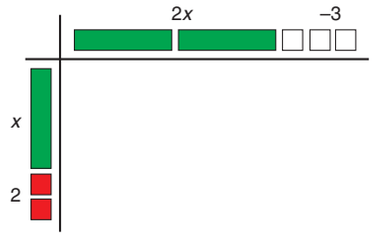
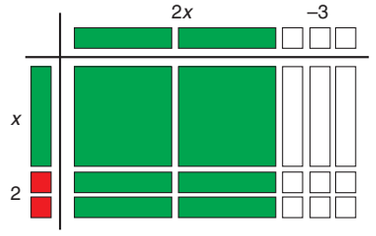
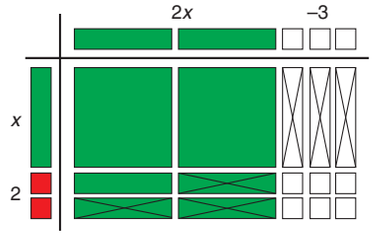
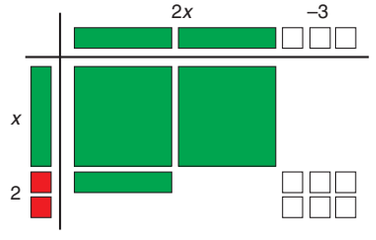
Appendix

Lesson 5.1: Polynomial Multiplication

Practice – I

1. Show the multiplication of $(2x-3)(x+2)$ using algebra tiles and symbolically. Show how the steps of the two methods correspond.

Algebra Tiles	Symbolically
	$(2x-3)(x+2)$
	$=(2x)(x)+(2x)(2)+(-3)(x)+(-3)(2)$ $=2x^2+4x-3x-6$
	$=2x^2+(4-3)x-6$
	$=2x^2+x-6$

2. Expand and simplify, if possible.

   a. $(1-x)(2-y)$

   $$\begin{aligned}(1-x)(2-y) &= (1)(2)+(1)(-y)+(-x)(2)+(-x)(-y)\\ &= 2-y-2x+xy\end{aligned}$$

   b. $(n-r)(p+q)$

   $$\begin{aligned}(n-r)(p+q) &= (n)(p)+(n)(q)+(-r)(p)+(-r)(q)\\ &= np+nq-rp-rq\end{aligned}$$

   c. $(3-x)^2$

   $$\begin{aligned}(3-x)(3-x) &= (3)(3)+(3)(-x)+(-x)(3)+(-x)(-x)\\ &= 9-3x-3x+x^2\\ &= 9-6x+x^2\end{aligned}$$

   d. $(-z^2-3z+2)(1-z)$

   $$\begin{aligned}(-z^2-3z+2)(1-z) &= (-z^2)(1)+(-z^2)(-z)+(-3z)(1)+(-3z)(-z)+(2)(1)+(2)(-z)\\ &= -z^2+z^3-3z+3z^2+2-2z\\ &= z^3+2z^2-5z+2\end{aligned}$$

3. Alex was asked to multiply two binomials: $(6d+2)(7d-5)$

   His work is shown below.

   $$\begin{aligned}(6d+2)(7d-5) &= (6d)(7d)+(2)(-5)\\ &= 42d^2-10\end{aligned}$$

   a. Alex's work is not correct. What error did he make?

   Alex did not multiply each term in the first binomial by each term in the second binomial.

b. Write a friendly recommendation to Alex explaining a strategy he could use to improve his solution. In your explanation, suggest how he could numerically verify the product.

Responses will vary. A sample is shown.

Alex, a lot of what you have written is correct, but you are missing some steps.

Using a numerical verification, you can see that your solution has an error. Here I've shown a verification using $d = 2$.

Left Side	Right Side
$(6d+2)(7d-5) = (6(2)+2)(7(2)-5)$ $= (14)(9)$ $= 126$	$42d^2 - 10 = 42(2)^2 - 10$ $= 168 - 10$ $= 158$

If you have the found the correct product, the two sides will be equal for any value of d.

To multiply two binomials, you need to multiply each term in the first binomial by each term in the second binomial and then add the products. The four products you should get from multiplying $(6d+2)(7d-5)$ are:

- $(6d)(7d)$
- $(6d)(-5)$
- $(2)(7d)$
- $(2)(-5)$

Then, find the sum of these products and verify your solution.

4. After a book is bound, the three free edges are cut to give the book a clean finish. Suppose a book's pages have uncut dimensions of l and w, measured in centimetres. Write a binomial multiplication and its product to represent the finished area of a page if 0.75 cm is cut from each free edge.

$(l-1.5)(w-0.75) = lw - 0.75l - 1.5w + 1.125$

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Please complete *Lesson 5.1 Explore Your Understanding Assignment* located in *Workbook 5.1* before proceeding to *Lesson 5.2*.