Name: _____ Date: _____

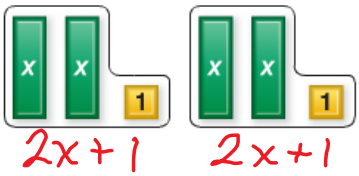
Distributive Property and Factoring Algebraic Expressions

How can we use algebra tiles to represent algebraic expressions?

You can also use algebra tiles to model expressions with variables. Refer to the set of algebra tiles below.

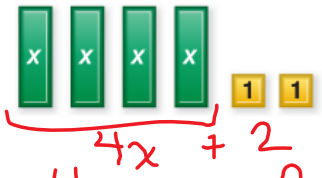
Example 1: Use the distributive property and algebra tiles to rewrite $2(2x + 1)$ without parentheses.

Step 1 Model the expression $2(2x + 1)$.



There are 2 groups with $2x + 1$ in each group.

Step 2 Group like tiles together.



The model shows 4 x-tiles and 2 integer tiles.

$\rightarrow 4x + 2 = 2(2x+1)$

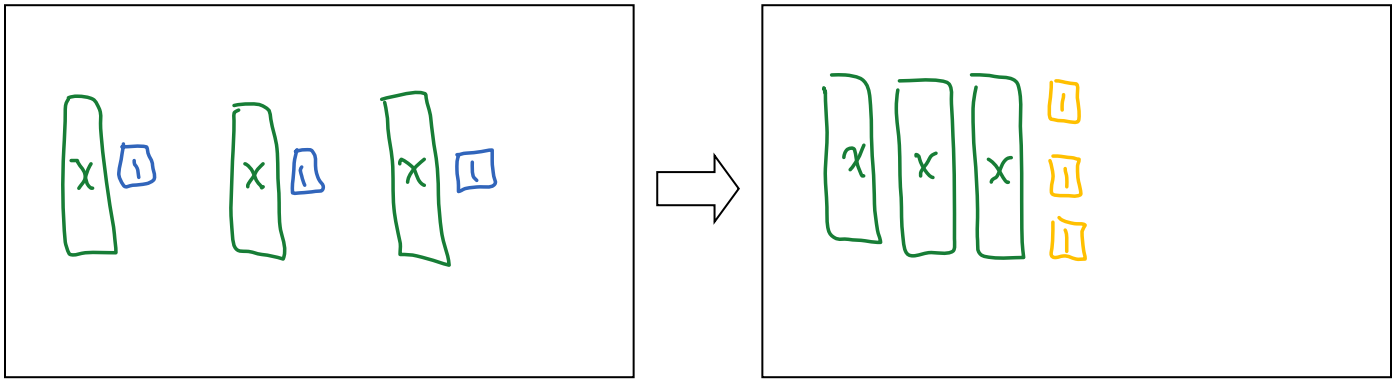
$2(2x) + 2(1)$

$4x + 2$

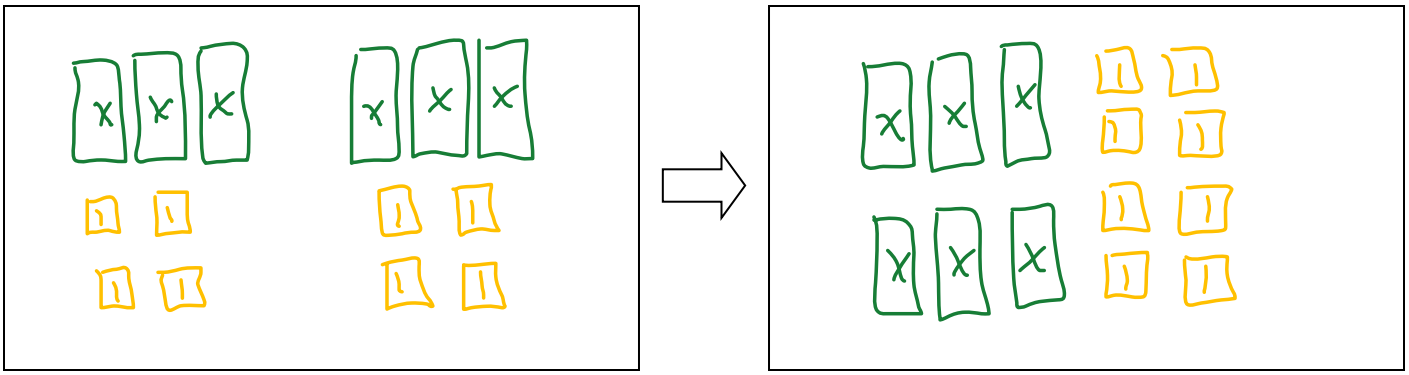
Both models have the same number of x-tiles and the same number of integer tiles.

Now your try! Use the distributive property and algebra tiles to rewrite the following algebraic expressions without parentheses.

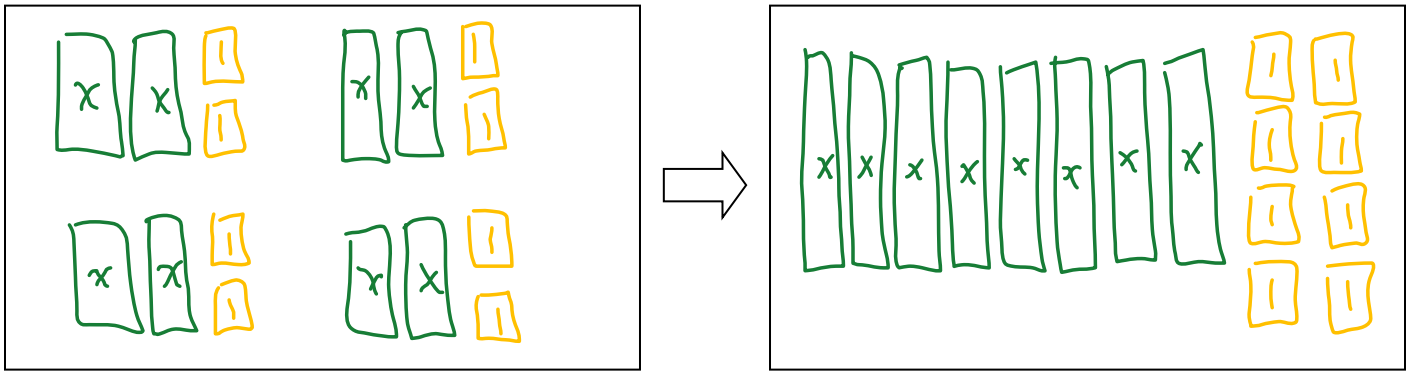
1) $3(x + 1)$ = $3x + 3$



2) **2(3*x* + 4)** = $6x + 8$



3) **4(2*x* + 2)** = $8x + 8$



How can we use the distributive property to write equivalent algebraic expressions without using algebra tiles?

Example 2: $2(x + 3)$

$2(5+3)$

$2(5)+2(3)$

$2(x+3)$

$2x+2(3)$

$2x+6$

Now your try! Use the distributive property to rewrite the following algebraic expressions without parentheses.

d. $8(x + 3)$

$8(x+3)$

$8x+24$

e. $5(9 + x)$

$5(9)+5(x)$

$45+5x$

f. $6(2x + 7)$

$6(2x+7)$

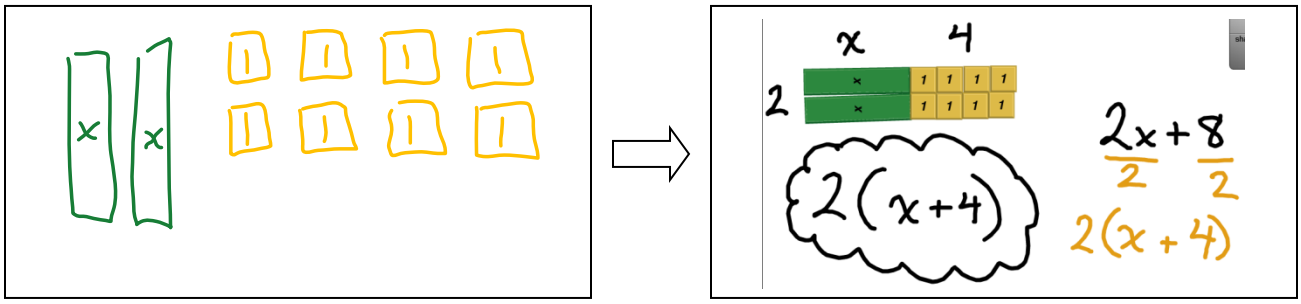
$12x+42$

$6 \cdot 2 \cdot x$

$12 \cdot x$

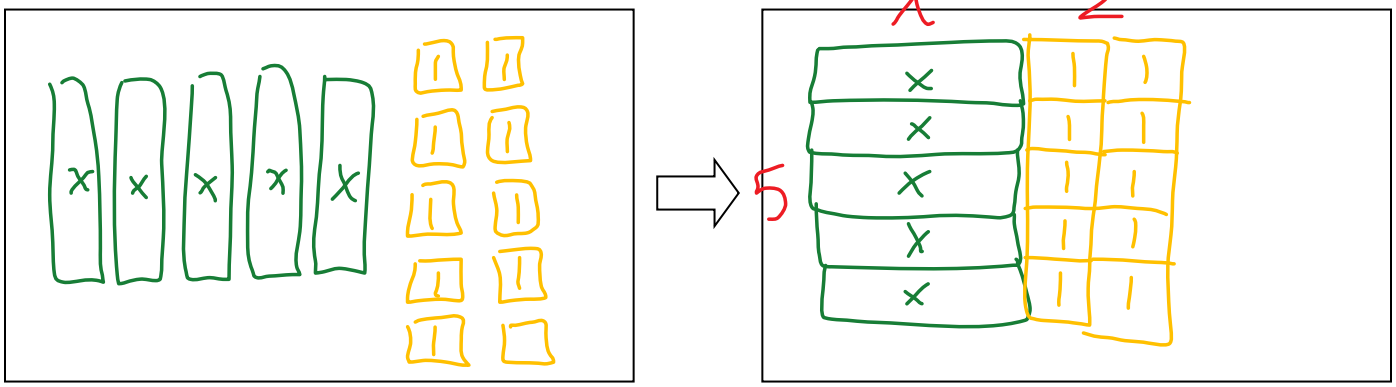
How can algebra tiles help us factor algebraic expressions?

<u>Example 3:</u> Factor the expression 2*x* + 8 using algebra tiles. Sketch out the different layouts you used to simplify the expression.

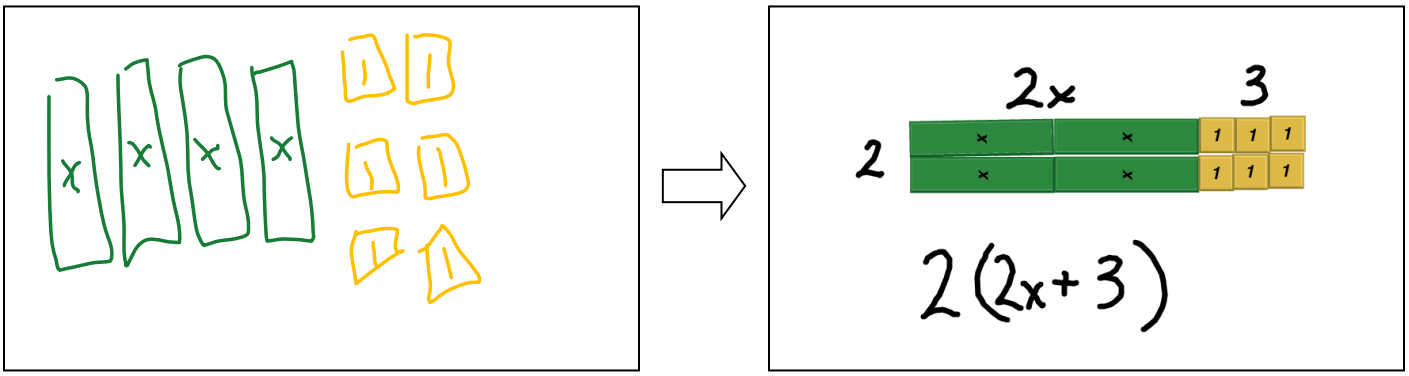


Now your try! Use algebra tiles to factor the following algebraic expressions.

1) **5*x* + 10** **=** $\frac{5(x+2)}{2}$



2) **4*x* + 6** **=** _____



How can we factor algebraic expressions without algebra tiles?

Example 4: **Factor $16x + 20$.**

$16x + 20$

GCF of 16 & 20 = 4

$4(4x+5)$

$\frac{16}{4} + \frac{20}{4} = 4(4+5)$

$16 = 2 \cdot 2 \cdot 2 \cdot 2$

$20 = 2 \cdot 2 \cdot 5$

$GCF = 2 \cdot 2 = 4$

$\frac{16x}{4}$

$\frac{20}{4} = 5$

Factor each expression using algebra tiles.

a) $35x + 28$

GCF of 35 & 28

$35 = 5 \cdot 7$

$28 = 2 \cdot 2 \cdot 7$

$GCF = 7$

$\frac{35x}{7} =$

$\frac{28}{7} =$

$7(5x+4)$

b) $24 + 18x$

$24 = 2 \cdot 2 \cdot 2 \cdot 3$

$18 = 2 \cdot 3 \cdot 3$

$GCF: 6 = 6(4+3x)$

$\frac{24}{6} = 4$

$\frac{18x}{6} = 3x$

$6(4+3x)$

c) $16x + 40$

$40 = 2 \cdot 2 \cdot 2 \cdot 5$

$16 = 2 \cdot 2 \cdot 2 \cdot 2$

$GCF = 8$

$8(5+2x)$

d) $10x + 15$

$5(2x+3)$

e) $49 + 63x$

$7(7+9x)$

f) $15 + 21x$

$3(5+7x)$