Lesson 3

November 1, 2018 11:00 AM

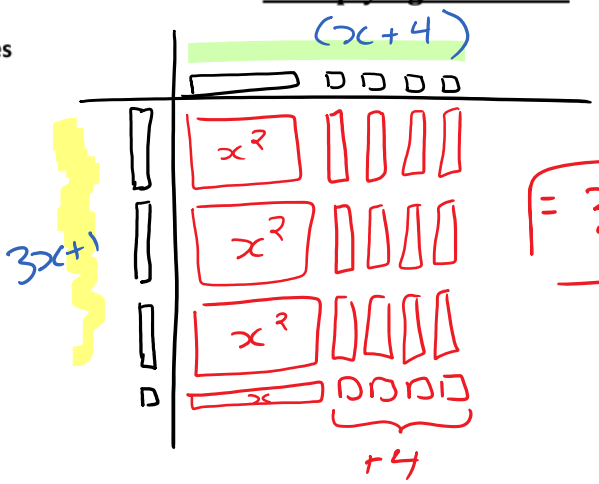
Name: _____

Lesson #3 - Multiplying Binomials

PART I: Algebra Tiles

$(3x + 1)(x + 4)$

Binomial 2=terms.



$= 3x^2 + 13x + 4$

PART II: Binomial x Binomial = F.O.I.L (First Outside Inside Last)

F O

1. $(3x + 1)(x + 4) = 3x^2 + 12x + x + 4$
$= 3x^2 + 13x + 4$

L

① FOIL
② collect liketerms

2. $(2x + 5)(x + 3) =$ $2x^2 + 6x + 5x + 15$ FOIL ✓

$= 2x^2 + 11x + 15$

* watch the (-)

3. $(5x + 6)(x - 2) =$ $5x^2 - 10x + 6x - 12$ FoiL ✓

$-10 + 6 = -4$

$= 5x^2 - 4x - 12$

4. $(7x + 1)(7x - 1) =$ $49x^2 - 7x + 7x - 1$

$-7 + 7 = \emptyset$

$= 49x^2 - 1$ * There is no x term.

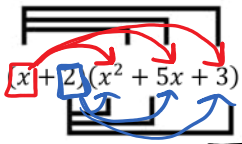
5. $(5x - 4)^2 =$ $(5x - 4)(5x - 4)$

$25x^2 - 20x - 20x + 16$

$= 25x^2 - 40x + 16$

$x^3 \neq x^2 \neq x$

PART III: Binomial x Trinomial (6 multiplication steps)

1. $(x+2)(x^2+5x+3) =$ 

$x^3 + 5x^2 + 3x + 2x^2 + 10x + 6$

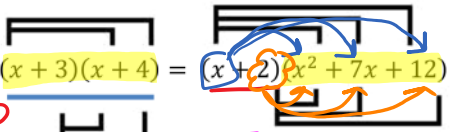
① FOIL to expand

② Collect Like Terms

$= x^3 + 7x^2 + 13x + 6$

(2T) · (2T) · (2T) → (Binomial)(Trinomial)

PART IV: Binomial x Binomial x Binomial

1. $(x+2)(x+3)(x+4) =$ 

② Binomial x Trinomial (FOIL)

① expand 2 of the binomials
- First 2
- or last 2

$= x^3 + 7x^2 + 12x + 2x^2 + 14x + 24$

③ Combine Like Terms

$= x^3 + 9x^2 + 26x + 24$

2. $3(x+10)(x-2)(x+2)$

① multiply monomial x binomial

$(3x+30)(x-2)(x+2)$

② Expand 1st 2 binomials FOIL (doesn't matter if you do 1st 2 or last 2)

$(3x^2 - 6x + 30x - 60)(x+2)$

collect terms

③ Multiply the binomial x trinomial

$(3x^2 + 24x - 60)(x+2)$

$3x^3 + 6x^2 + 24x^2 + 48x - 60x - 120$

④ Collect Like Terms + Simplify

$= 3x^3 + 30x^2 - 12x - 120$

Homework

ASSIGNMENT # 3

Pages 20-24 Questions #108-139

Multiplying Binomials

Challenge:

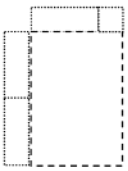
108. Which of the following are equal to $x^2 + 9x + 18$?

a) $(x+3)(x+6)$
b) $(x+1)(x+18)$
c) $(x-3)(x-6)$
d) $(x+2)(x+9)$

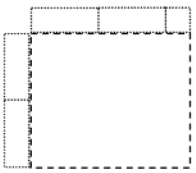
Challenge:

109. Multiply $(2x+1)(x-5)$

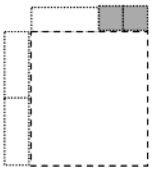
110. Write an equation represented by the diagram below and then multiply the two polynomials using the area model.



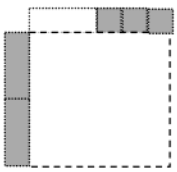
111. Write an equation represented by the diagram below and then multiply the two polynomials using the area model.



112. Write an equation represented by the diagram below and then multiply the two polynomials using the area model.



113. Write an equation represented by the diagram below and then multiply the two polynomials using the area model.



114. Draw and use an area model to find the product:
$(x+2)(2x+1)$

115. Draw and use an area model to find the product:
$(2x-1)(x-3)$

116. Draw and use an area model to find the product:
$(2 - x)(x + 2)$

117. Draw and use an area model to find the product:
$(3 - x)(x - 1)$

118. Draw and use an area model to find the product:
$(3x + 1)(2x + 1)$

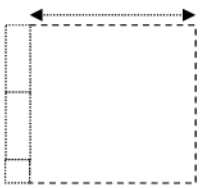
119. Write a quotient that can be represented by the diagram below and then find the missing side length using the area model.

Area $= x^2 + 3x + 2$

Length:_____

120. Write a quotient that can be represented by the diagram below and then find the missing side length using the area model.

Area $= 2x^2 + 5x + 2$



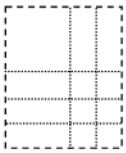
Length:_____

121. Write a quotient that can be represented by the diagram below and then find the missing side length using the area model.

Area $= 4x^2 - 8x + 3$

Length:_____

122. Find the area, length and width that can be represented by the diagram.

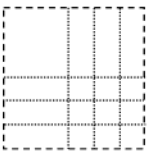


Area:

Length:

Width:

123. Find the area, length and width that can be represented by the diagram.

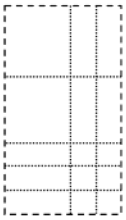


Area:

Length:

Width:

124. Find the area, length and width that can be represented by the diagram.



Area:

Length:

Width:

125. Draw tiles that represent the multiplication of $(x + 1)(x - 3)$.

What is the product of $(x + 1)(x - 3)$?

126. Draw tiles that represent the multiplication of $(2x + 1)(2x + 1)$.

What is the product of $(2x + 1)(2x + 1)$?

127. Draw tiles that represent the multiplication of $(x - 4)(x + 4)$.

What is the product of $(x - 4)(x + 4)$?

Multiplying Polynomials without TILES (also called expanding or distribution)

Multiplying Binomials: *use FOIL

Eg.1. $(x+3)(x+6) = x^2 + 6x + 3x + 18 = \mathbf{x^2 + 9x + 18}$

FOIL
Firsts - Outsides-Insides-Lasts
(x)(x) + (x)(6) + (3)(x) + (3)(6)

Eg.2. $(2x+1)(x-5) = 2x^2 - 10x + x - 5 = \mathbf{2x^2 - 9x - 5}$

Multiplying a Binomial by a Trinomial:

Eg. $(y-3)(y^2-4y+7) = y^3 - 4y^2 + 7y - 3y^2 + 12y - 21 = \mathbf{y^3 - 7y^2 + 19y - 21}$

Multiply each term in the first polynomial by each term in the second.

Multiplying: Binomial × Binomial × Binomial

Eg. $(x+2)(x-3)(x+4)$
$= (x^2 - 3x + 2x - 6)(x+4)$
$= (x^2 - x - 6)(x+4)$
$= x^3 + 4x^2 - x^2 - 4x - 6x - 24$
$= \mathbf{x^3 + 3x^2 - 10x - 24}$

Multiply the first two brackets (FOIL) to make a new trinomial.

Then multiply the new trinomial by the remaining binomial

Multiply the following as illustrated above.

128. $(x+2)(x-5)$

129. $(2x+1)(x-3)$

130. $(x-3)(x-3)$

Multiply the following.

131. $(x+2)(x+2)$

132. $(2x+1)(3x-3)$

133. $(2x+1)(2x-1)$

134. $(x+2)^2$

135. $(2x+5)^2$

136. $(x-1)(x-1)(x+4)$

137. $(x-5)(x^2-5x+1)$

138. $(2x-3)(3x^2+2x+1)$

139. $(x+2)^3$