

Concept: Multiplying Expressions

Name: _____

➤ *You should have completed Algebra – Section 7 Part A: Multiplying Expressions before beginning this handout.*

OFF-COMPUTER COMPONENT

1. (a) Draw the tile representation for $(2x)(4x)$.



(b) What is the answer to $(2x)(4x)$? $8x^2$

2. (a) Draw the tile representation for $3x(x+1)$.



(b) What is the simplified form of $3x(x+1)$? $3x^2 + 3x$

3. Simplify. Do not use tile drawings here.

(a) $(5a^3)(-3a^2) = -15a^5$

(b) $(2ab)(6a^2b^3) = 12a^3b^4$

(c) $2(d - 3) = 2d - 6$

(d) $4g(g + 2) = 4g^2 + 8g$

COMPUTER COMPONENT: Part B

Instructions: In follow the **Content Menu** path:

Algebra > Multiplying Expressions

NOTE: Use the **Menu** button in order to get to the lesson where you left off.



Work through all Sub Lessons of the following Lessons **in order**:

- *Multiplying Binomials*
- *Examples ... True or False?*



As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

SUMMARY: Part B

1. Express $(x + 2)(x + 3)$ as a product of 4 sums: $x^2 + \underline{2}x + \underline{3}x + \underline{6} = \underline{x^2 + 5x + 6}$

2. What does the acronym FOIL stand for?

F ▷ **FIRST**

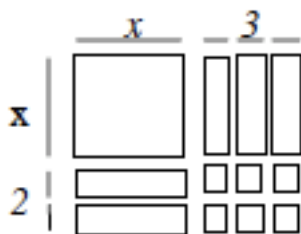
O ▷ **OUTER**

I ▷ **INNER**

L ▷ **LAST**

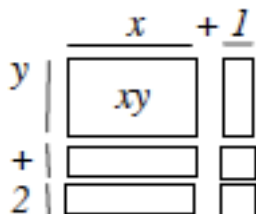
3. *Multiplying Binomials ... With Tiles.*

Example 1: (a) Draw tiles to fill this rectangle that is $(x+2)$ units by $(x+3)$ units. Be sure to use a ruler.



(b) The total area is $x^2 + 5x + 6$ units.

Example 2: (a) Draw tiles to fill this rectangle that is $(x+1)$ units by $(y+2)$ units. Be sure to use a ruler.



(b) The total area is $xy + 2x + y + 2$ units.

OFF COMPUTER EXERCISES: Part B

1. Use the FOIL rule in order to expand and simplify these binomials.

$$\begin{aligned}
 \text{(a)} \quad & (x - 4)(x - 5) \\
 & = x^2 - 4x - 5x + 20 \\
 & = x^2 - 9x + 20
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad & (x + 1)(x - 6) \\
 & = x^2 + x - 6x - 6 \\
 & = x^2 - 5x - 6
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad & (2x + 6)(x + 4) \\
 & = 2x^2 + 6x + 8x + 24 \\
 & = 2x^2 + 14x + 24 \\
 & = 2(x^2 + 7x + 12)
 \end{aligned}$$

$$\begin{aligned}
 \text{(d)} \quad & (2x - 4)(3x + 2) \\
 & = 6x^2 - 12x + 4x - 8 \\
 & = 6x^2 - 8x - 8
 \end{aligned}$$

$$\begin{aligned}
 \text{(e)} \quad & (-x + 1)(2x - 4) \\
 & = -2x^2 + 2x + 4x - 4 \\
 & = -2x^2 + 6x - 4 \\
 & = -2(x^2 - 3x + 2)
 \end{aligned}$$

$$\begin{aligned}
 \text{(f)} \quad & (3x - 1)(2x + 2) \\
 & = 6x^2 - 2x + 6x - 2 \\
 & = 6x^2 + 4x - 2
 \end{aligned}$$

$$\begin{aligned}
 \text{(g)} \quad & (2a - b)(4a + b) \\
 & = 8a^2 - 4ab + 2ab - b^2 \\
 & = 8a^2 - 2ab - b^2
 \end{aligned}$$

$$\begin{aligned}
 \text{(h)} \quad & (3m - 4n)(3m + 2n) \\
 & = 9m^2 - 12mn + 6mn - 8n^2 \\
 & = 9m^2 - 6mn - 8n^2
 \end{aligned}$$

$$\begin{aligned}
 \text{(i)} \quad & (5v + 2w)(3v + 4w) \\
 & = 15v^2 + 6vw + 20vw + 8w^2 \\
 & = 15v^2 + 26vw + 8w^2
 \end{aligned}$$

$$\begin{aligned}
 \text{(j)} \quad & (-p - 5)(-p + 9) \\
 & = p^2 + 5p - 9p - 45 \\
 & = p^2 - 4p - 45
 \end{aligned}$$

$$\begin{aligned}
 \text{(k)} \quad & (-z + 6)(z - 5) \\
 & = -z^2 + 6z + 5z - 30 \\
 & = -z^2 + 11z - 30
 \end{aligned}$$

$$\begin{aligned}
 \text{(l)} \quad & (-4c - 4d)(-9c - 5d) \\
 & = 36c^2 + 36c + 20cd + 20d^2 \\
 & = 36c^2 + 56cd + 20d^2 \\
 & = 4(9c^2 + 14cd + 5d^2)
 \end{aligned}$$

2. The following questions incorporate all of the skills that you have learned in this section:

- monomial x monomial
- monomial x binomial
- binomial x binomial

$$\begin{aligned} \text{(a)} \quad & (5x^2)(7x^5) \\ & = 35x^7 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & 4(2a - 3b) \\ & = 8a - 12b \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & -(4x + 5y - 1) \\ & = -4x - 5y + 1 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad & -2(a^2 - 6a + 7) \\ & = -2a^2 + 12a - 14 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad & 3x(x + 2) + 2x(x + 5) \\ & = 3x^2 + 6x + 2x^2 + 10x \\ & = 5x^2 + 16x \end{aligned}$$

$$\begin{aligned} \text{(f)} \quad & w(w + 2) - (2w - 2) \\ & = w^2 + 2w - 2w - 4 \\ & = w^2 - 4 \end{aligned}$$

$$\begin{aligned} \text{(g)} \quad & 5(x^2 + 2x - 7) - 3x(x + 4) \\ & = 5x^2 + 10x - 35 - 3x^2 - 12x \\ & = 2x^2 - 2x - 35 \end{aligned}$$

$$\begin{aligned} \text{(h)} \quad & 6(2p - 5q) + 5(-6p + 2q) \\ & = 12p - 30q - 30p + 10q \\ & = -18p - 20q \end{aligned}$$

$$\begin{aligned} \text{(i)} \quad & 6(4m + 5)(3m + 5) \\ & = (24m + 30)(3m + 5) \\ & = 72m^2 + 90m + 120m + 150 \\ & = 72m^2 + 210m + 150 \end{aligned}$$

$$\begin{aligned} \text{(j)} \quad & 2(2v - 9)(7v + 3) \\ & = (2m^3 - 8m) - m(m^2 - 2m + 8m + 16) \\ & = 2m^3 - 8m - m^3 + 2m^3 - 8m^3 + 16m \\ & = m^3 - 6m^3 + 8m \end{aligned}$$