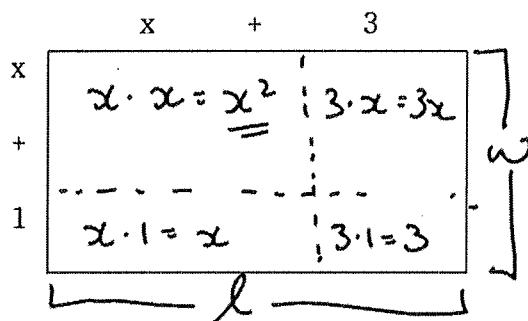
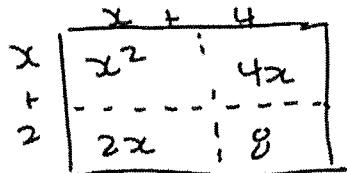


Binomial Products

Find an expression for the area of the example below.



$$\begin{aligned}
 A &= l \cdot w \\
 &= (x+3)(x+1) \\
 &= x^2 + 3x + x + 3 \\
 &= x^2 + 4x + 3
 \end{aligned}$$

What about $(x+2)(x+4)$? Find a pattern.

$$\begin{aligned}
 A &= l \cdot w \\
 &= (x+4)(x+2) \\
 &= x^2 + 4x + 2x + 8 \\
 &= x^2 + 6x + 8
 \end{aligned}
 \quad \left. \begin{array}{l} \text{* Each term} \\ \text{must be} \\ \text{multiplied by} \\ \text{all the other} \\ \text{terms.} \end{array} \right\}$$

Another way to think of this is:

First Outside Inside Last

$$\begin{aligned}
 &(x+4)(x+2) \\
 &= (x \cdot x)(2 \cdot x)(4 \cdot x)(4 \cdot 2) \\
 &= x^2 + 2x + 4x + 8 \\
 &= x^2 + 6x + 8
 \end{aligned}$$

Shaking Hands

$$\begin{aligned}
 &(x+4)(x+2) - \text{separate 1st binomial} \\
 &= x(\cancel{x+2}) + 4(\cancel{x+2}) \\
 &= x^2 + 2x + 4x + 8 \\
 &= x^2 + 6x + 8. \quad \text{- each term must shake hands with the other!}
 \end{aligned}$$

Ex: 1) Expand and simplify:

a) $(x+5)(x+1)$

$$\begin{aligned}
 &= x^2 + 5x + x + 5 \\
 &= x^2 + 6x + 5
 \end{aligned}$$

b) $(x-8)(x+2)$

$$\begin{aligned}
 &= x^2 - 8x + 2x - 16 \\
 &= x^2 - 6x - 16
 \end{aligned}$$

c) $(y-8)(y-3)$

$$\begin{aligned}
 &= y^2 - 8y - 3y + 24 \\
 &= y^2 - 11y + 24
 \end{aligned}$$

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

$$\begin{aligned}
 &= 2x^2 + 3x - 4x - 6 \\
 &= 2x^2 - x - 6
 \end{aligned}$$

e) $(3x-4)(2x-5)$

$$\begin{aligned}
 &= 6x^2 - 15x - 8x + 20 \\
 &= 6x^2 - 23x + 20
 \end{aligned}$$