Name:

eton

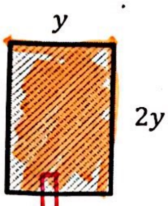
Lesson 5: Multiplying Polynomials

Part 1: Area

$A = b \cdot h$

Write an expression that represents the area of the rectangle shown.

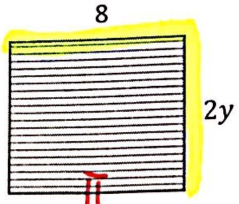
a.



$y \cdot 2y$

$2y^2$

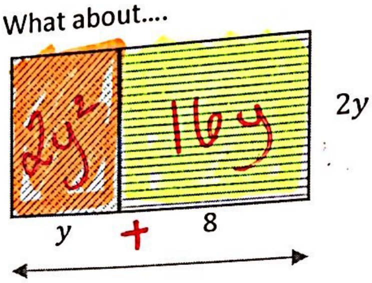
b.



$8 \cdot 2y$

$16y$

c. What about....



What expression represents this length?

$y+8$

So what product represents the area of this figure?

$2y(y+8) = 2y^2 + 16y$

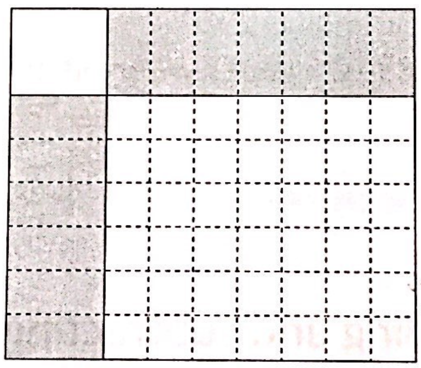
Area of a rectangle is found by multiplying the lengths of the two sides.

We can think about multiplying polynomials in this same way.

Part 2: Determining area using a model and the distributive property.

Draw a diagram that represents the area of $(x+5)$ *and* $(x+7)$.

blank!



It's okay.

Polynomials can be multiplied...

using the *distributive property.*

$(x+5)(x+7)$

$x(x+7) \quad +5(x+7)$

$x^2 + 7x \quad + 5x + 35$

$\boxed{x^2 + 12x + 35}$

EACH TERM IN EACH BINOMIAL MUST MULTIPLY BY EACH TERM OF THE SECOND

...using a Punnett Square

$(x+5)(x+7)$

	x	$+5$
x	$x \cdot x$ x^2	$x \cdot 5$ $5x$
$+7$	$7 \cdot x$ $7x$	$7 \cdot 5$ 35

-each "sub box" is the product of two terms from the polynomials.

→ add!

$x^2 + \boxed{5x + 7x} + 35$

Simplify!

$\boxed{x^2 + 12x + 35}$

Scanned with CamScanner

a. $(x+9)(x+2)$

$= 63$

	x	$+9$
x	x^2	$+9x$
$+2$	$+2x$	18

$x^2+9x+2x+18$

$\boxed{x^2+11x+18}$

b. $(x-5)(x-3)$

	x	-5
x	x^2	$-5x$
-3	$-3x$	$+15$

$x^2-5x-3x+15$

$\boxed{x^2-8x+15}$

c. $(2x+1)(x+4)$

	$2x$	$+1$
x	$2x^2$	$+1x$
$+4$	$8x$	$+4$

$2x^2+8x+1x+4$

$\boxed{2x^2+9x+4}$

d. $(x+1)(x-7)$

	x	$+1$
x	x^2	$+1x$
-7	$-7x$	-7

$x^2-7x+1x-7$

$\boxed{x^2-6x-7}$

e. $\left(x+\frac{15}{2}\right)(x-1)$

☆ ☆

	x	$+\frac{15}{2}$
x	x^2	$\frac{15}{2}x$
-1	$-1x$	$-\frac{15}{2}$

$x^2+\frac{15}{2}x-1x-\frac{15}{2}$

$x^2+\frac{15}{2}x-\frac{2}{2}x-\frac{15}{2}$

$\boxed{x^2+13/2x-15/2}$

f. $\left(x-\frac{5}{4}\right)\left(x-\frac{3}{4}\right)$

	x	$-\frac{5}{4}$
x	x^2	$-\frac{5}{4}x$
$-\frac{3}{4}$	$-\frac{3}{4}x$	$+\frac{15}{16}$

$x^2-\frac{5}{4}x-\frac{3}{4}x+\frac{15}{16}$

$x^2-\frac{8}{4}x+\frac{15}{16}$

$\boxed{x^2-2x+15/16}$

Exploring the Product of Two Binomials

Why is the product of each one of these two binomials a trinomial? (Why are there three terms in your answer)?

(leave as a blank)

Could the product of two binomials ever make ....

...4 terms?	...more than 4 terms?	...Two terms?
leave	blank	

Part 3: Special products

Multiply: $(x+3)(x-3)$

	x	$+3$
x	x^2	$+3x$
-3	$-3x$	-9

$\Rightarrow x^2+3x-3x-9$

$\boxed{x^2-9}$

By looking at the problem, how could you have predicted that your product would have been a binomial?

SAME EXPRESSION, OPPOSITE SIGNS

Types of special products

Difference of two squares	Square of a Binomial
$(a-b)(a+b)=a^2+ab-ab-b^2$ $=a^2-b^2$	$(x+3)(x+3) \rightleftarrows (x+3)^2$

Practice

a. $(3x-7)(3x+7)$ ☆

	$3x$	-7
$3x$	$9x^2$	$-21x$
$+7$	$+21x$	-49

$9x^2-21x+21x-49$

$\boxed{9x^2-49}$

b. $(x+4)^2$

EXPAND

$(x+4)(x+4)$

	x	$+4$
x	x^2	$+4x$
$+4$	$+4x$	$+16$

$\boxed{x^2+8x+16}$

c. $(2y-3)^2$

EXPAND

$(2y-3)(2y-3)$

	$2y$	-3
$2y$	$4y^2$	$-6y$
-3	$-6y$	$+9$

$\boxed{4y^2-12y+9}$

d. $(m-6)(m+6)$ ☆

	m	-6
m	m^2	$-6m$
$+6$	$+6m$	-36

$m^2-6m+6m-36$

$\boxed{m^2-36}$

Exit Ticket:

How are these products alike, and how are they different?

$(a+6)^2$ $\qquad$ $(a-6)^2$