

3.7. Multiplying Polynomials

Two methods → distributive property
 ↘ area model

ex.1) $(2x-3)^2$
 $(2x-3)(2x-3)$

Distributive

$$2x(2x-3) - 3(2x-3)$$

$$4x^2 - 6x - 6x + 9$$

$$4x^2 - 12x + 9$$

Area Model

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

ex.2) $(x^2-2x+1)(2x^2+3x+5)$

Distributive Property

$$x^2(2x^2+3x+5) - 2x(2x^2+3x+5) + 1(2x^2+3x+5)$$

$$2x^4 + 3x^3 + 5x^2 - 4x^3 - 6x^2 - 10x + 2x^2 + 3x + 5$$

$$2x^4 - x^3 + x^2 - 7x + 5$$

Area Model

	x^2	$-2x$	$+1$
$2x^2$	$2x^4$	$-4x^3$	$+2x^2$
$+3x$	$+3x^3$	$-6x^2$	$+3x$
$+5$	$5x^2$	$-10x$	$+5$

$$2x^4 - x^3 + x^2 - 7x + 5$$

$$\text{ex. 3) } (2x+1)^2 - (x+5)(x-2)$$

$$(2x+1)(2x+1) - (x+5)(x-2)$$

$$2x(2x+1) + 1(2x+1) - x(x-2) + 5(x-2)$$

$$4x^2 + 2x + 2x + 1 - x^2 - 2x + 5x - 10$$

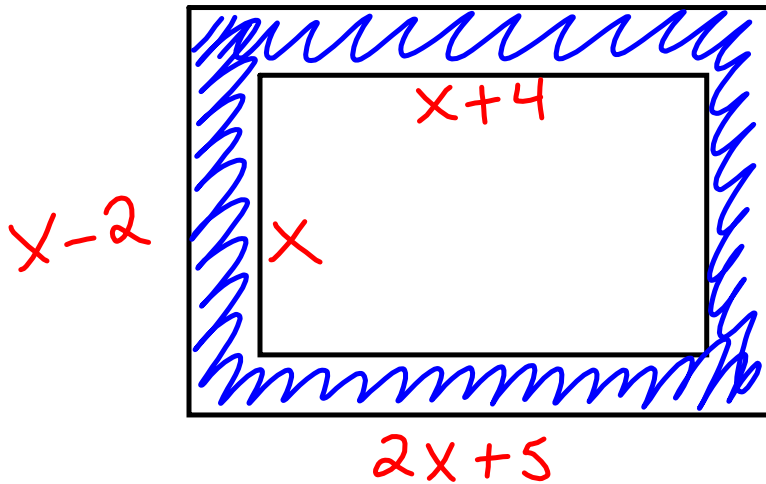
$$4x^2 + 4x + 1 - (x^2 + 3x - 10)$$

$$4x^2 + 4x + 1 - x^2 - 3x + 10$$

$$\boxed{3x^2 + x + 11}$$

* with subtraction:
multiply the negative
through

Area of Shaded Region



Area of large Rectangle — Area of small rectangle

$$(2x+5)(x-2) - x(x+4)$$

$$2x(x-2) + 5(x-2) - (x^2 + 4x)$$

small area

$$2x^2 - 4x + 5x - 10$$

$$2x^2 + x - 10$$

large area

$$\begin{array}{r} 2x^2 + x - 10 \\ - \quad x^2 + 4x \\ \hline x^2 - 3x - 10 \end{array}$$