

1. Use a  $2 \times 2$  box for  $(x + 3)(x + 4)$ . List the four cells.

$x^2$ ,  $x^4$ ,  $3x$ ,  $3^4$

Answer:  $x^2$ ,  $4x$ ,  $3x$ ,  $12$  - sum  $x^2 + 7x + 12$

2. Box  $(x + 5)(x + 2)$ : sum of cells?

$x^2$ ,  $2x$ ,  $5x$ ,  $10$

Answer:  $x^2 + 7x + 10$

3. Box  $(x - 3)(x + 6)$ : watch the signs in the cells.

$x^2$ ,  $6x$ ,  $-3x$ ,  $-18$

Answer:  $x^2 + 3x - 18$

4. Box  $(2x + 1)(x + 3)$ :

$2x^2$ ,  $6x$ ,  $x$ ,  $3$

Answer:  $2x^2 + 7x + 3$

5. Box  $(3x - 2)(x - 4)$ :

$3x^2$ ,  $-12x$ ,  $-2x$ ,  $8$

Answer:  $3x^2 - 14x + 8$

6. Box  $(x + 4)^2$ :

$x^2$ ,  $4x$ ,  $4x$ ,  $16$

Answer:  $x^2 + 8x + 16$

7. Why does the area model ALWAYS work?

Area of whole = sum of parts

Answer: distribution as geometry

8. Box  $(2x - 5)(2x + 5)$ : what happens to the middle cells?

$+10x$  and  $-10x$

Answer: they cancel -  $4x^2 - 25$

9. Use a  $2 \times 3$  box for  $(x + 2)(x^2 + 3x + 1)$ . ★ challenge

Cells:  $x^3$ ,  $3x^2$ ,  $x$ ,  $2x^2$ ,  $6x$ ,  $2$

Combine

Answer:  $x^3 + 5x^2 + 7x + 2$

10. An area model has cells  $x^2$ ,  $5x$ ,  $3x$ ,  $15$ . What were the factors, and what is the total area when  $x = 4$ ?

Rows/cols:  $(x + 3)(x + 5)$

$x = 4$ :  $7 \times 9$

Answer:  $(x+3)(x+5)$ ; 63