Answers

Check each one before moving on

Move between them

1. Headers x, $+6$ across and x, $+2$ down: $(x+2)(x+6) = x^2 + 8x + 12$.
2. $(x+3)(x+7)$. The areas are x^2, $7x$, $3x$, 21, so the answer is $x^2 + 10x + 21$.
3. Both models have cells x^2, x, $4x$, 4, giving $x^2 + 5x + 4$.
4. $(x+5)(x+6)$. The grid rows are x and $+5$, the columns are x and $+6$, and the answer is $x^2 + 11x + 30$.

Work backwards

5. The column header is 9 (since $9x \div x$) and the row header is 4 (since $36 \div 9$). The missing cell is $4x$, so the answer is $(x+4)(x+9) = x^2 + 13x + 36$.
6. The other side is $x + 5$. The cells are x^2, $5x$, $3x$, 15. Check that $5x + 3x = 8x$.
7. He missed $3 \times x$. The correct answer is $x^2 + 8x + 15$.
8. The middle cells are $2x$ and $5x$, because the two numbers multiply to 10 and add to 7. The answer is $(x+2)(x+5)$.

Stretch the models

9. The cells are x^2, $7x$, $-2x$, -14, giving $x^2 + 5x - 14$. A side of length -2 cannot be drawn. The grid only keeps track of products, so signs cause no problem there.
10. $2x^2 + 11x + 12$. The area model needs two x^2 squares side by side, next to $8x$ (that is, $2x \times 4$) and $3x$ (that is, $3 \times x$), and 12.
11. There is no single answer. Look for a reason. (a) The area model makes 200 and $30x$ easy to see. (b) The grid or arrows handle the negatives. (c) The grid in reverse: find the pair that multiplies to 20 and adds to 9, which gives $(x+4)(x+5)$.