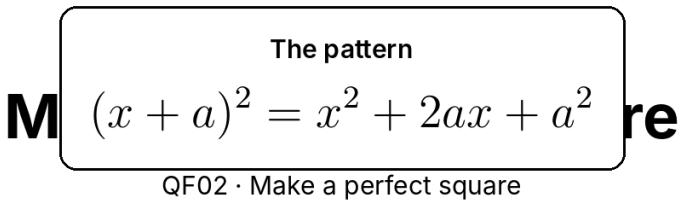
Make a Perfect Square

QF02-V1 · storyboard · QF02 Make a perfect square. Read each picture with its sentences.

Picture 1



QF02 · Make a perfect square

① **Half the coefficient of x**

② **Square it**

③ **Add it: a perfect square**

1. Look at the pattern.
2. x plus a, all squared, is x squared, plus 2 a x, plus a squared.
3. The middle coefficient is 2 a, and the constant is a squared: the square of half the middle coefficient.

Picture 2

Make $x^2 + 6x$ a perfect square.

$\frac{6}{2} = 3$ half of 6

$3^2 = 9$ square it

$$\boxed{x^2 + 6x + 9 = (x + 3)^2}$$

4. Make x squared plus 6 x a perfect square.
5. Half of 6 is 3.
6. 3 squared is 9.
7. That is the number to add.
8. x squared plus 6 x plus 9 is x plus 3, all squared.

Picture 3

Make $r^2 + 3r$ a perfect square.

$$\left(\frac{3}{2}\right)^2 = \frac{9}{4}$$ half of 3, squared

$$\boxed{r^2 + 3r + \frac{9}{4} = \left(r + \frac{3}{2}\right)^2}$$

9. Now an odd number.
10. Make r squared plus 3 r a perfect square.
11. Half of 3 is 3 halves, and 3 halves squared is 9 quarters.
12. So r squared plus 3 r plus 9 quarters is r plus 3 halves, all squared.

Picture 4

Trap $x^2 + 6x + c$

$\times \; c = 3$

$\checkmark \quad c = 3^2 = 9$

13. Watch for the trap: c is not 3.
14. Square the half: 3 squared is 9.

Picture 5

Trap $x^2 - 6x + 9$

$\times \; (x + 3)^2$

$\checkmark \quad (x - 3)^2$

15. Another trap: x squared minus 6 x plus 9 is not x plus 3, all squared.
16. Half of negative 6 is negative 3: the bracket keeps the sign.