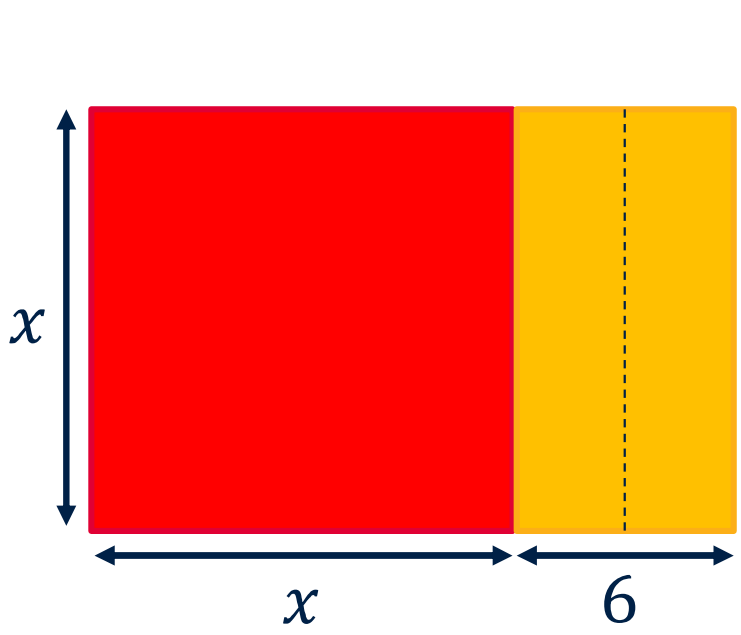
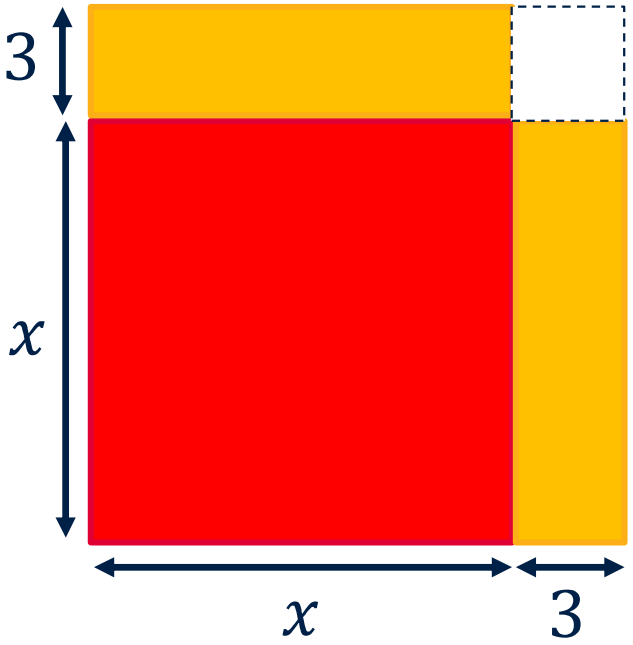
Did you know?

These are different forms of the same algebraic expression

$$x^2 + 6x \quad = \quad x(x+6) \quad = \quad (x+3)^2 - 9$$

expanded form | factorised form | completed square form



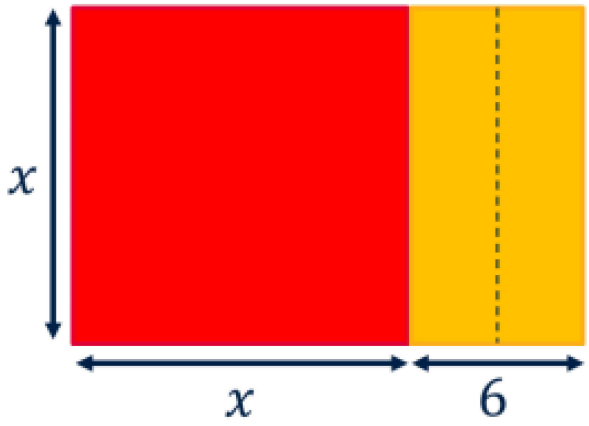


Do the diagrams help you see why this is called Completing the square?

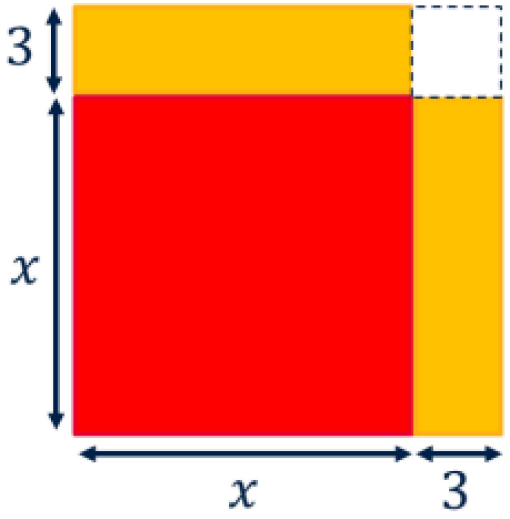
Something similar

Think you've seen these diagrams before?

- They are very similar to the diagrams for the Difference of Two Squares – *as seen previously in Expanding Double Brackets.*



$$x^2 + 6x$$



Can you see this is the difference of two squares?

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

$$\big((x+3)-3\big)\big((x+3)+3\big)$$

Collect like terms within the brackets

$$= x(x+6)$$

$$= x^2 + 6x$$

Completing the square 1

Write these expressions in the form $(x + a)^2 + b$

1. $x^2 + 4x$
2. $x^2 + 4x + 5$
3. $y^2 - 8y$
4. $y^2 - 8y + 7$
5. $x^2 - 12x + 41$
6. $k^2 + 10k - 2$
7. $y^2 + 3y + 1$
8. $p^2 - 2p + 1$

Completing the square 1

Solutions on the next slide….

Completing the square 1

Write these expressions in the form $(x + a)^2 + b$

1. $x^2 + 4x \rightarrow = (x + 2)^2 - 4$

2. $x^2 + 4x + 5 \rightarrow = (x + 2)^2 + 1$

3. $y^2 - 8y \rightarrow = (y - 4)^2 - 16$

4. $y^2 - 8y + 7 \rightarrow = (y - 4)^2 - 9$

Unsure about any of these? Search Completing the square. Next try Skills check 2….

Completing the square 1

Write these expressions in the form $(x + a)^2 + b$

5. $x^2 - 12x + 41 \rightarrow = (x - 6)^2 + 5$

6. $k^2 + 10k - 2 \rightarrow = (k + 5)^2 - 27$

7. $y^2 + 3y + 1 \rightarrow = \left(y + \frac{3}{2}\right)^2 - \frac{5}{4}$

8. $p^2 - 2p + 1 \rightarrow = (p - 1)^2$

Unsure about any of these? Search Completing the square. Next try Skills check 2….

Completing the square 2

Write these expressions in the form $(x + a)^2 + b$

1. $x^2 + 10x$
2. $x^2 + 10x + 30$
3. $y^2 - 2y$
4. $y^2 - 2y + 3$
5. $x^2 - 8x + 25$
6. $k^2 + 14k - 1$
7. $y^2 + 5y + 6$
8. $t^2 + 6t + 9$

You can do this for fun - or move on if you correctly completed Skills check 1.

Completing the square 2

Solutions on the next slide….

Completing the square 2

Write these expressions in the form $(x + a)^2 + b$

1. $x^2 + 10x \rightarrow = (x + 5)^2 - 25$

2. $x^2 + 10x + 30 \rightarrow = (x + 5)^2 + 5$

3. $y^2 - 2y \rightarrow = (y - 1)^2 - 1$

4. $y^2 - 2y + 3 \rightarrow = (y - 1)^2 + 2$

Completing the square 2

Write these expressions in the form $(x + a)^2 + b$

5. $x^2 - 8x + 25 \rightarrow = (x - 4)^2 + 9$

6. $k^2 + 14k - 1 \rightarrow = (k + 7)^2 - 50$

7. $y^2 + 5y + 6 \rightarrow = \left(y + \frac{5}{2}\right)^2 - \frac{1}{4}$

8. $t^2 + 6t + 9 \rightarrow = (t + 3)^2$