JRA Tutors
Private tuition and small online Study Pods

Completing the Square

Grade 8/9 topic · Higher tier · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Questions 1–15 (45 marks) build up to the harder Grade 8–9 style questions at the end; aim to complete all 20. Show your working on the lines and write your final answer on the answer line, then mark yourself with the answers at the back. Diagrams are not drawn accurately. Total: 69 marks.

Warm-up

1 Expand and simplify $(x - 5)^2$. **[2 marks]**

Answer _____

2 Expand and simplify $(x + 1)^2$. **[2 marks]**

Answer _____

3 Expand and simplify $(x + 3)^2$. **[2 marks]**

Answer _____

4 Expand and simplify $(x - 6)^2$. **[2 marks]**

Answer _____

5 Expand and simplify $(x - 1)^2$. **[2 marks]**

Answer _____

Core

6 Write $x^2 - 2x + 10$ in the form $(x + p)^2 + q$. **[3 marks]**

Answer _____

7 Write $x^2 - 2x - 7$ in the form $(x + p)^2 + q$. **[3 marks]**

Answer _____

8 Write $x^2 - 2x$ in the form $(x + p)^2 + q$. **[3 marks]**

Answer _____

9 Write $x^2 - 4x + 11$ in the form $(x + p)^2 + q$. **[3 marks]**

Answer _____

10 Write $x^2 + 14x + 51$ in the form $(x + p)^2 + q$. **[3 marks]**

Answer _____

Stretch

11 Write $x^2 - 8x + 22$ in the form $(x + p)^2 + q$, and write down the minimum value of the expression. **[4 marks]**

Answer _____

12 Write $x^2 - 6x + 16$ in the form $(x + p)^2 + q$, and write down the minimum value of the expression. **[4 marks]**

Answer _____

13 Write $x^2 - 10x + 21$ in the form $(x + p)^2 + q$, and write down the minimum value of the expression. **[4 marks]**

Answer _____

14 The curve $y = x^2 - 14x + 42$ has a turning point. Write down its coordinates. **[4 marks]**

Answer _____

15 The curve $y = x^2 - 10x + 25$ has a turning point. Write down its coordinates. **[4 marks]**

Answer _____

Challenge

16 Write $2x^2 + 8x + 2$ in the form $a(x + p)^2 + q$. **[5 marks]**

Answer _____

17 Solve $x^2 + 6x + 1 = 0$ by completing the square. Give your answers in the form $a \pm \sqrt{b}$. **[5 marks]**

Answer _____

18 Write $9 + 4x - x^2$ in the form $a - (x - p)^2$. **[5 marks]**

Answer _____

19 Work out the minimum value of $2x^2 - 12x + 19$ and the value of x at which it occurs. **[5 marks]**

Answer _____

20 Show that $x^2 + 4x + 10$ is always positive. **[4 marks]**

Answer _____