

Completing the Square RED

- 1) (a) Complete the square for $x^2 + 8x - 9$.

$$(x + 4)^2 - (4)^2 - 9$$

$$(x + 4)^2 - 16 - 9$$

$$(x + 4)^2 - 25$$

- 1) Halve the coefficient of x .
- 2) Put in brackets with the x and square the brackets.
- 3) Subtract the half-coefficient squared.
- 4) Don't forget the constant on the end!
- 5) Simply.

- (b) Hence solve $x^2 + 8x - 9 = 0$

$$(x + 4)^2 - 25 = 0$$

$$(x + 4)^2 = 25$$

$$x + 4 = \pm\sqrt{25}$$

$$x = -4 \pm\sqrt{25} = 1 \text{ or } -9$$

Solve your answer from part (a). Don't forget the positive AND negative square root.

- (c) Identify the minimum point of $y = x^2 + 8x - 9$

$$(x + 4)^2 - 25$$

$$\text{Minimum} = (-4, -25)$$

Use your answer from part (a). Remember for $(x - p)^2 + q = 0$ the minimum is (p, q) .

- 2) (a) Complete the square for $x^2 - 6x - 10$.

$$(x - 3)^2 - (-3)^2 - 10$$

- (b) Hence solve $x^2 - 6x - 10 = 0$

- (c) Identify the minimum point of $y = x^2 - 6x - 10$.

3) (a) Complete the square for $x^2 + 10x - 9$.

(b) Hence solve $x^2 + 10x - 9 = 0$

(c) Identify the minimum point of $y = x^2 + 10x - 9$.

4) (a) Complete the square for $x^2 + 6x - 7$.

(b) Hence solve $x^2 + 6x - 7 = 0$

(c) Identify the minimum point of $y = x^2 + 6x - 7$.

5) (a) Complete the square for $x^2 - 10x + 3$.

1) Halve the coefficient of x .
2) Put in brackets with the x and square the brackets.
3) Subtract the half-coefficient squared.
4) Don't forget the constant on the end!
5) Simply.

(b) Hence solve $x^2 - 10x + 3 = 0$

Solve your answer from part (a). Don't forget the positive AND negative square root.

(c) Identify the minimum point of $y = x^2 - 10x + 3$.

Use your answer from part (a). Remember for $(x - p)^2 + q = 0$ the minimum is (p, q) .

6) (a) Complete the square for $x^2 - 7x + 1$.

(b) Hence solve $x^2 - 7x + 1 = 0$

(c) Identify the minimum point of $y = x^2 - 7x + 1$.

7) (a) Complete the square for $x^2 + 12x - 5$.

(b) Hence solve $x^2 + 12x - 5 = 12$

Be careful with the
+12 on the RHS!

(c) Identify the minimum point of $y = x^2 + 12x - 5$.

8) (a) Complete the square for $x^2 + 3x + 4$.

(b) Hence solve $x^2 + 3x + 4 = 9$

Be careful with the
+9 on the RHS!

(c) Identify the minimum point of $y = x^2 + 3x + 4$.

Completing the Square AMBER

1) (a) Complete the square for $x^2 + 8x - 9$.

1) Halve the coefficient of x .
2) Put in brackets with the x and square the brackets.
3) Subtract the half-coefficient squared.
4) Don't forget the constant on the end!
5) Simply.

(b) Hence solve $x^2 + 8x - 9 = 0$

Solve your answer from part (a). Don't forget the positive AND negative square root.

(c) Identify the minimum point of $y = x^2 + 8x - 9$

Use your answer from part (a). Remember for $(x - p)^2 + q = 0$ the minimum is (p, q) .

2) (a) Complete the square for $x^2 - 6x - 10$.

(b) Hence solve $x^2 - 6x - 10 = 0$

(c) Identify the minimum point of $y = x^2 - 6x - 10$.

3) (a) Complete the square for $x^2 + 10x - 9$.

(b) Hence solve $x^2 + 10x - 9 = 0$

(c) Identify the minimum point of $y = x^2 + 10x - 9$.

4) (a) Complete the square for $x^2 + 6x - 7$.

(b) Hence solve $x^2 + 6x - 7 = 0$

(c) Identify the minimum point of $y = x^2 + 6x - 7$.

5) (a) Complete the square for $x^2 - 10x + 3$.

(b) Hence solve $x^2 - 10x + 3 = 0$

(c) Identify the minimum point of $y = x^2 - 10x + 3$.

6) (a) Complete the square for $x^2 - 7x + 1$.

(b) Hence solve $x^2 - 7x + 1 = 0$

(c) Identify the minimum point of $y = x^2 - 7x + 1$.

7) (a) Complete the square for $x^2 + 12x - 5$.

(b) Hence solve $x^2 + 12x - 5 = 12$

(c) Identify the minimum point of $y = x^2 + 12x - 5$.

8) (a) Complete the square for $x^2 + 3x + 4$.

(b) Hence solve $x^2 + 3x + 4 = 9$

(c) Identify the minimum point of $y = x^2 + 3x + 4$.

Completing the Square GREEN

- 5) (a) Complete the square for $x^2 - 10x + 3$.
- (b) Hence solve $x^2 - 10x + 3 = 0$
- (c) Identify the minimum point of $y = x^2 - 10x + 3$.
- 6) (a) Complete the square for $x^2 - 7x + 1$.
- (b) Hence solve $x^2 - 7x + 1 = 0$
- (c) Identify the minimum point of $y = x^2 - 7x + 1$.

7) (a) Complete the square for $x^2 + 12x - 5$.

(b) Hence solve $x^2 + 12x - 5 = 12$

(c) Identify the minimum point of $y = x^2 + 12x - 5$.

8) (a) Complete the square for $x^2 + 3x + 4$.

(b) Hence solve $x^2 + 3x + 4 = 9$

(c) Identify the minimum point of $y = x^2 + 3x + 4$.

9) (a) Complete the square for $4x^2 + 8x - 12$.

(b) Hence solve $4x^2 + 8x - 12 = 0$

(c) Identify the minimum point of $y = 4x^2 + 8x - 12$.

10) (a) Complete the square for $3x^2 + 6x - 9$.

(b) Hence solve $3x^2 + 6x - 9 = 0$

(c) Identify the minimum point of $y = 3x^2 + 6x - 9$.

11) (a) Complete the square for $5x^2 + 10x - 16$.

(b) Hence solve $5x^2 + 10x - 16 = 8$

(c) Identify the minimum point of $y = 5x^2 + 10x - 16$.

12) (a) Complete the square for $2x^2 + 6x + 5$.

(b) Hence solve $2x^2 + 6x + 5 = 12$

(c) Identify the minimum point of $y = 2x^2 + 6x + 5$.

Answers

	(a)	(b)	(c)
1	$(x + 4)^2 - 25$	$x = 1 \text{ or } -9$	$(-4, -25)$
2	$(x - 3)^2 - 19$	$x = 3 \pm \sqrt{19}$	$(3, -19)$
3	$(x + 5)^2 - 34$	$x = -5 \pm \sqrt{34}$	$(-5, -34)$
4	$(x + 3)^2 - 16$	$x = 1 \text{ or } -7$	$(-3, -16)$
5	$(x - 5)^2 - 22$	$x = 5 \pm \sqrt{22}$	$(5, -22)$
6	$(x - 7/2)^2 - 45/4$	$x = 7/2 \pm 3/2\sqrt{5}$	$(3.5, 11.25)$
7	$(x + 6)^2 - 41$	$x = -6 \pm \sqrt{53}$	$(-6, -41)$
8	$(x + 3/2)^2 + 7/4$	$x = -3/2 \pm \frac{1}{2}\sqrt{29}$	$(-1.5, 1.75)$
9	$4(x + 1)^2 - 16$	$x = 1 \text{ or } -3$	$(-1, -16)$
10	$3(x + 1)^2 - 12$	$x = 1 \text{ or } -3$	$(-1, -12)$
11	$5(x + 1)^2 - 21$	$x = -1 \pm \sqrt{(29/5)}$	$(-1, -21)$
12	$2(x + 3/2)^2 + \frac{1}{2}$	$x = -3/2 \pm \frac{1}{2}\sqrt{23}$	$(-1.5, 0.5)$