Solving Quadratics by Completing the Square

SCAN ME

REVISE THIS TOPIC

1 By completing the square, solve the equation $x^2 - 4x + 1 = 0$ **[4 marks]**

Give your answers in the form $a \pm \sqrt{3}$, where a is an integer.

You must show all your working.

$(x-2)^2 - 3 = 0$

$(x-2)^2 = 3$

$x - 2 = \pm\sqrt{3}$

$x = 2 \pm \sqrt{3}$

Answer $x = 2+\sqrt{3}$ $x = 2-\sqrt{3}$

2 By completing the square, solve the equation $x^2 - 10x + 19 = 0$ **[4 marks]**

Give your answers in the form $a \pm \sqrt{6}$, where a is an integer.

You must show all your working.

$(x-5)^2 - 6 = 0$

$(x-5)^2 = 6$

$x - 5 = \pm\sqrt{6}$

$x = 5 \pm \sqrt{6}$

Answer $x = 5+\sqrt{6}$ $x = 5-\sqrt{6}$

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3 By completing the square, solve the equation $x^2 + 6x - 1 = 0$ **[4 marks]**

Give your answers in the form $a \pm \sqrt{10}$, where a is an integer.

You must show all your working.

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

$(x+3)^2 = 10$

$x + 3 = \pm\sqrt{10}$

$x = -3 \pm \sqrt{10}$

Answer $x = -3 + \sqrt{10}$ $x = -3 - \sqrt{10}$

4 By completing the square, solve the equation $x^2 - 2x - 4 = 0$ **[4 marks]**

Give your answers in the form $a \pm \sqrt{5}$, where a is an integer.

You must show all your working.

$(x-1)^2 - 5 = 0$

$(x-1)^2 = 5$

$x - 1 = \pm\sqrt{5}$

$x = 1 \pm \sqrt{5}$

Answer $x = 1 + \sqrt{5}$ $x = 1 - \sqrt{5}$

5 By completing the square, solve the equation $x^2 + 20x + 93 = 0$ **[4 marks]**

Give your answers in the form $a \pm \sqrt{7}$, where a is an integer.

You must show all your working.

$(x+10)^2 - 7 = 0$

$(x+10)^2 = 7$

$x + 10 = \pm\sqrt{7}$

$x = -10 \pm \sqrt{7}$

Answer $x = -10 + \sqrt{7}$ $x = -10 - \sqrt{7}$

6 By completing the square, solve the equation $x^2 - 4x - 4 = 0$ **[4 marks]**

Give your answers in the form $a \pm b\sqrt{2}$, where a and b are integers.

You must show all your working.

$(x-2)^2 - 8 = 0$

$(x-2)^2 = 8$

$x - 2 = \pm\sqrt{8}$

$x = 2 \pm \sqrt{8}$

$\sqrt{8} = \sqrt{4} \times \sqrt{2}$

$= 2\sqrt{2}$

Answer $x = 2 + 2\sqrt{2}$ $x = 2 - 2\sqrt{2}$

7 By completing the square, solve the equation $x^2 - 10x - 50 = 0$ **[4 marks]**

Give your answers in the form $a \pm b\sqrt{3}$, where a and b are integers.

You must show all your working.

$(x-5)^2 - 75 = 0$

$(x-5)^2 = 75$

$x - 5 = \pm\sqrt{75}$

$x = 5 \pm \sqrt{75}$

$\sqrt{75} = \sqrt{25} \times \sqrt{5}$

$= 5\sqrt{5}$

Answer $x = 5 + 5\sqrt{3}$ $x = 5 - 5\sqrt{3}$

8 By completing the square, solve the equation $x^2 - 16x - 26 = 0$ **[4 marks]**

Give your answers in the form $a \pm b\sqrt{10}$, where a and b are integers.

You must show all your working.

$(x-8)^2 - 90 = 0$

$(x-8)^2 = 90$

$x - 8 = \pm\sqrt{90}$

$x = 8 \pm \sqrt{90}$

$\sqrt{90} = \sqrt{9} \times \sqrt{10}$

$= 3\sqrt{10}$

Answer $x = 8 + 3\sqrt{10}$ $x = 8 - 3\sqrt{10}$

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9 By completing the square, solve the equation $x^2 + 15x + 21 = 3x - 9$ **[5 marks]**

Give your answers in the form $a \pm \sqrt{6}$, where a is an integer.

You must show all your working.

$x^2 + 12x + 30 = 0$

$(x+6)^2 - 6 = 0$

$(x+6)^2 = 6$

$x + 6 = \pm\sqrt{6}$

$x = -6 \pm \sqrt{6}$

Answer $x = -6 + \sqrt{6}$ $x = -6 - \sqrt{6}$

10 By completing the square, solve the equation $x^2 - 6x + 4 = 5 - 2x$ **[5 marks]**

Give your answers in the form $a \pm \sqrt{5}$, where a is an integer.

You must show all your working.

$x^2 - 4x - 1 = 0$

$(x-2)^2 - 5 = 0$

$(x-2)^2 = 5$

$x - 2 = \pm\sqrt{5}$

$x = 2 \pm \sqrt{5}$

Answer $x = 2 + \sqrt{5}$ $x = 2 - \sqrt{5}$

11 By completing the square, solve the equation $x^2 + 3x + 7 = 9x + 6$ **[5 marks]**

Give your answers in the form $a \pm b\sqrt{2}$, where a and b are integers.

You must show all your working.

$x^2 - 6x + 1 = 0$

$(x-3)^2 - 8 = 0$

$(x-3)^2 = 8$

$x - 3 = \pm\sqrt{8}$

$x = 3 \pm \sqrt{8}$

$\sqrt{8} = \sqrt{4} \times \sqrt{2}$

$= 2\sqrt{2}$

Answer $x = 3 + 2\sqrt{2}$ $x = 3 - 2\sqrt{2}$

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