Corbett maths

Quadratics: Solving using Completing the Square
Video 267a on www.corbettmaths.com

Examples

Workout

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Question 1: Solve each of the equations below using completing the square

(a) $x^2 + 6x + 8 = 0$ (b) $x^2 + 10x + 24 = 0$ (c) $x^2 + 14x + 40 = 0$

(d) $x^2 - 4x - 45 = 0$ (e) $x^2 - 12x + 35 = 0$ (f) $x^2 - 2x - 3 = 0$

(g) $x^2 + 14x - 51 = 0$ (h) $x^2 - 6x - 16 = 0$ (i) $x^2 - 2x + 1 = 0$

Question 2: Solve each of the following equations using completing the square

(a) $x^2 + 5x + 4 = 0$ (b) $x^2 - 3x - 18 = 0$ (c) $x^2 + x - 12 = 0$

(d) $x^2 - 7x + 12 = 0$ (e) $x^2 - 11x + 24 = 0$ (f) $x^2 - 7x - 30 = 0$

Question 3: Solve each of the following equations using completing the square
Write each answer in simplified surd form

(a) $x^2 + 4x - 3 = 0$ (b) $x^2 + 6x - 10 = 0$ (c) $x^2 - 2x - 5 = 0$

(d) $x^2 - 10x + 1 = 0$ (e) $x^2 + 8x + 3 = 0$ (f) $x^2 - 8x - 22 = 0$

(g) $x^2 + 20x + 7 = 0$ (h) $x^2 - 12x + 1 = 0$ (i) $x^2 - 30x - 100 = 0$

Question 4: Solve each of the following equations using completing the square
Write each answer in simplified surd form

(a) $x^2 + x - 7 = 0$ (b) $x^2 - 3x + 1 = 0$ (c) $x^2 + 11x - 5 = 0$

(d) $x^2 - 7x + 9 = 0$ (e) $x^2 - x - 50 = 0$ (f) $x^2 + 13x + 1 = 0$

Question 5: Solve each of the following equations using completing the square
Write each answer in simplified surd form

(a) $x^2 - 4x + 1 = 10$ (b) $x^2 + 2x + 5 = 20 - 8x$ (c) $3x^2 = 2x^2 + x + 7$

(d) $x^2 + 6x + 4 = 2x^2 + 8x - 1$ (e) $\frac{12}{x} = 10 + x$ (f) $\frac{x-1}{2} = \frac{5}{x+3}$

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Question 6: Solve each of the following equations using completing the square

(a) $5x^2 + 30x - 10 = 0$ (b) $2x^2 + 7x + 3 = 0$ (c) $3x^2 + 12x - 2 = 0$

(d) $2x^2 - 3x - 7 = 0$ (e) $5x^2 + 2x - 8 = 0$ (f) $10x^2 - 2x - 1 = 0$

Apply

Question 1: Find the points where the curve $y = x^2 + 10x + 3$ meets:
(a) the y-axis
(b) the x-axis

Question 2: The length of a rectangle is 20cm longer than its width.
The area of the rectangle is $1000cm^2$
Find the width and length of the rectangle.
Give your answers in surd form.

Question 3: Abby is trying to solve $x^2 + 4x + 15 = 0$
By using completing the square, explain why there are no (real) solutions

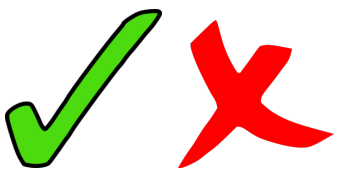
Question 4: The curve $y = x^2 + 8x - 1$ meets the x-axis at the points A and B
The point C is (2, 5)
Find the area of triangle ABC

Question 5: James has solved the equation $x^2 + ax + b = 0$
His solutions are $x = -3 + \sqrt{17}$ and $x = -3 - \sqrt{17}$
Find a and b

Question 6: By using completing the square on $ax^2 + bx + c = 0$ to establish the quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Answers



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