Algebra Mastery Worksheet

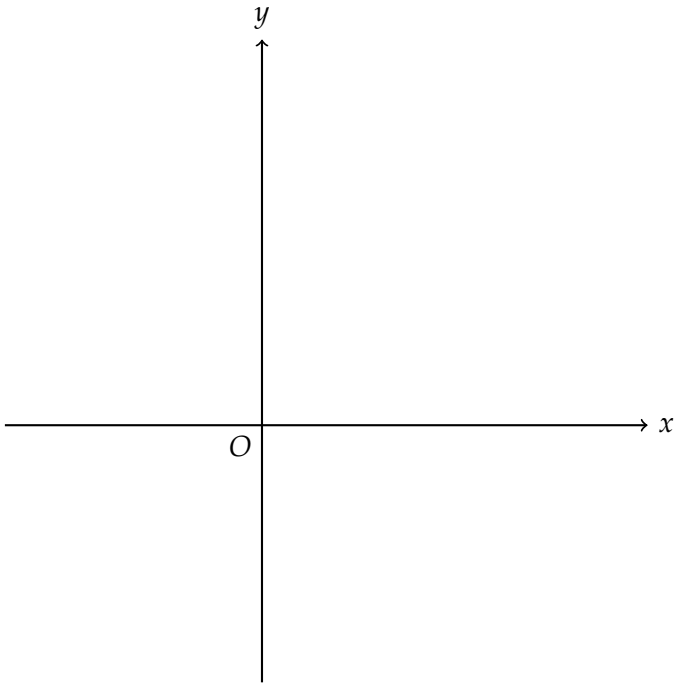
Completing the Square & Turning Points of Quadratics

Reference: Edexcel IGCSE June 2025 / Paper 2H / Q25

I Do

(a) Write $28 + 24x - 6x^2$ in the form $a - b(x - c)^2$ where a, b and c are integers.

(b) On the axes below, sketch the graph of $y = 28 + 24x - 6x^2$.
Show clearly the coordinates of the turning point and the coordinates of the point of intersection of the graph with the y-axis.

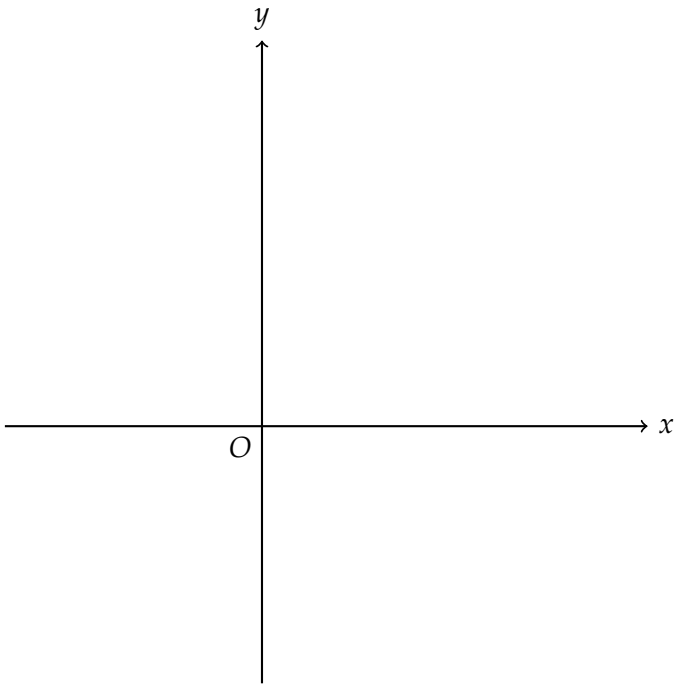


(Total for Question 1 is 6 marks)

We Do

(a) Write $15 + 20x - 5x^2$ in the form $a - b(x - c)^2$ where a, b and c are integers.

(b) On the axes below, sketch the graph of $y = 15 + 20x - 5x^2$.
Show clearly the coordinates of the turning point and the coordinates of the point of intersection of the graph with the y-axis.

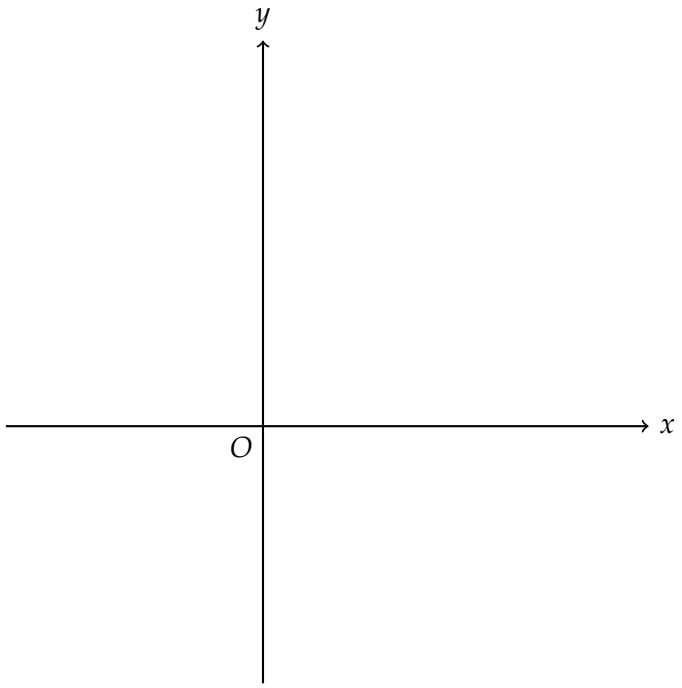


(Total for Question 2 is 6 marks)

You Do

(a) Write $10 + 24x - 3x^2$ in the form $a - b(x - c)^2$ where a, b and c are integers.

(b) On the axes below, sketch the graph of $y = 10 + 24x - 3x^2$.
Show clearly the coordinates of the turning point and the coordinates of the point of intersection of the graph with the y-axis.

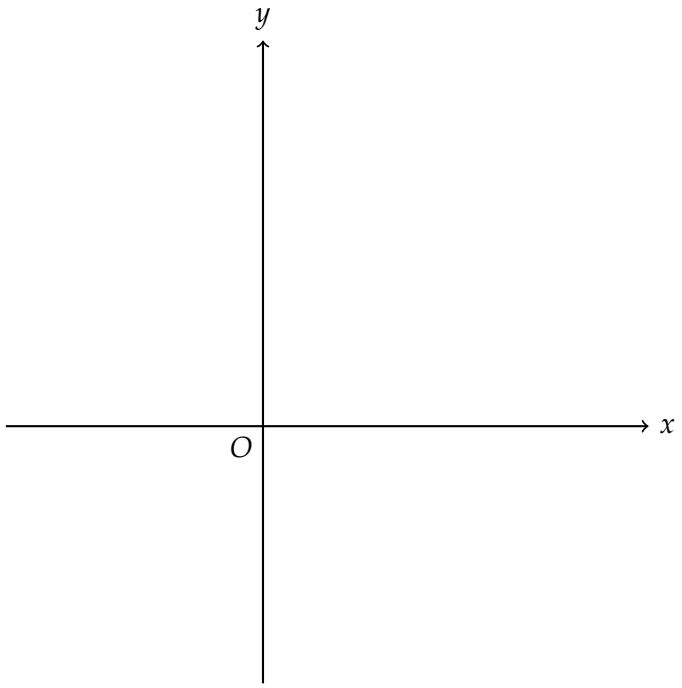


(Total for Question 3 is 6 marks)

Challenge

(a) Write $18 - 18x - 3x^2$ in the form $a - b(x + c)^2$ where a, b and c are integers.

(b) On the axes below, sketch the graph of $y = 18 - 18x - 3x^2$.
Show clearly the coordinates of the turning point and the coordinates of the point of intersection of the graph with the y-axis.



(Total for Question 4 is 6 marks)

Answers & Worked Solutions

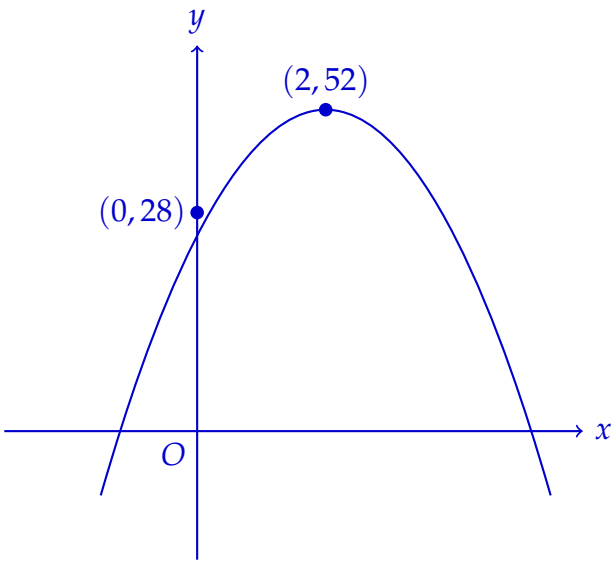
• **I Do:**

(a) Factorise out -6 ***from*** x ***terms:*** $-6(x^2 - 4x) + 28$

Complete the square: $-6\left[(x-2)^2 - 4\right] + 28 = -6(x-2)^2 + 24 + 28$

Simplify: $52 - 6(x-2)^2$

(b) Turning point: $(2, 52)$***,*** y***-intercept:*** $(0, 28)$**.**



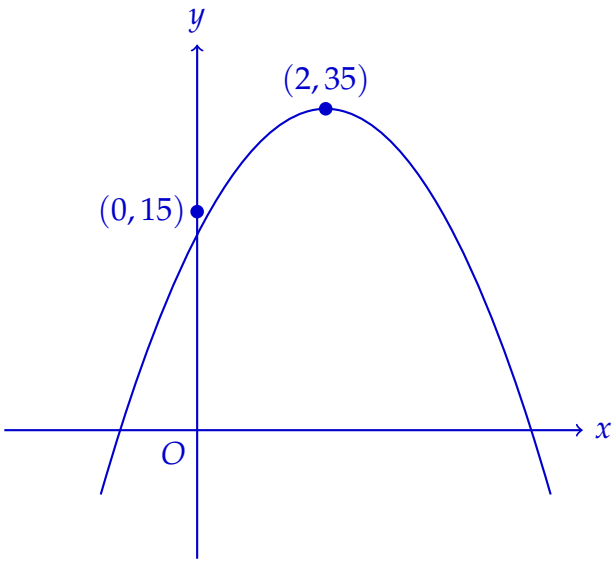
• **We Do:**

(a) Factorise out -5***:*** $-5(x^2 - 4x) + 15$

Complete the square: $-5\left[(x-2)^2 - 4\right] + 15 = -5(x-2)^2 + 20 + 15$

Simplify: $35 - 5(x-2)^2$

(b) Turning point: $(2, 35)$***,*** y***-intercept:*** $(0, 15)$**.**



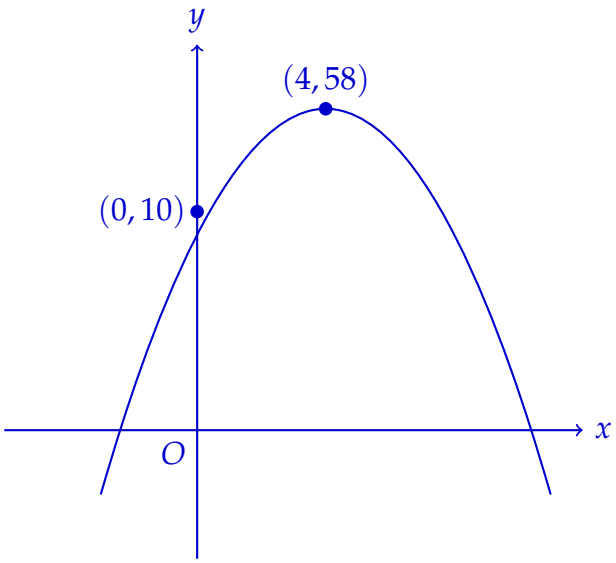
• **You Do:**

(a) Factorise out -3***:*** $-3(x^2 - 8x) + 10$

Complete the square: $-3\left[(x-4)^2 - 16\right] + 10 = -3(x-4)^2 + 48 + 10$

Simplify: $58 - 3(x-4)^2$

(b) Turning point: $(4, 58)$***,*** y***-intercept:*** $(0, 10)$**.**



• **Challenge:**

(a) Factorise out -3***:*** $-3(x^2+6x)+18$

Complete the square: $-3\left[(x+3)^2-9\right]+18=-3(x+3)^2+27+18$

Simplify: $45-3(x+3)^2$

(b) Turning point: $(-3,45)$***,*** y***-intercept:*** $(0,18)$**.**

