

1 Completing the square

- a) Write $x^2 + 10x + 7$ in the form $(x + p)^2 + q$.
 b) Hence write down the coordinates of the turning point of $y = x^2 + 10x + 7$.

a) $(x + 5)^2 - 25 + 7 = (x + 5)^2 - 18$
 b) $(-5, -18)$

2 Completing the square

- a) Solve $x^2 - 6x - 11 = 0$ by completing the square. Give your answers in the form $p \pm q\sqrt{5}$.
 b) Sam writes $x^2 - 6x - 11 = (x - 6)^2 - 47$. Explain his mistake.

a) $(x - 3)^2 = 20, x - 3 = \pm\sqrt{20} = \pm 2\sqrt{5}$
 $x = 3 \pm 2\sqrt{5}$
 b) he did not halve 6: $(x - 3)^2 - 20$

3 Iteration

- a) Use $x_{n+1} = 2 + \frac{5}{x_n^2}$ with $x_0 = 3$ to find x_1, x_2 and x_3 to 3 decimal places.
 b) Show that the iteration is solving $x^3 - 2x^2 - 5 = 0$.

a) $x_1 = 2.556, x_2 = 2.766, x_3 = 2.654$
 b) $x = 2 + \frac{5}{x^2}$, times by x^2 :
 $x^3 = 2x^2 + 5$

4 Iteration

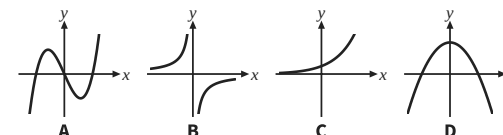
- a) Show that $x^3 + 2x = 20$ has a solution between 2.4 and 2.5.
 b) Leo says the solution is 2.4 to 1 decimal place. Show that he is wrong.

a) at 2.4: $18.624 < 20$, at 2.5: $20.625 > 20$
 b) at 2.45: $19.606 < 20$, so it is above 2.45

More graphs and equations revision mat answers

5 Recognising graphs

- a) Match each equation to its graph: $y = 2^x$ $y = 4 - x^2$
 $y = x^3 - 4x$ $y = -\frac{2}{x}$
 b) Which two pass through (2, 0)? Show how you know.



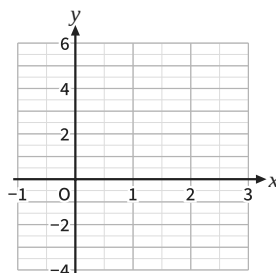
a) A $x^3 - 4x$, B reciprocal, C exponential, D $4 - x^2$
 b) A and D: $8 - 8 = 0, 4 - 4 = 0$

6 Plotting quadratic graphs

- a) Complete the table for $y = 2x^2 - 4x - 1$.

x	-1	0	1	2	3
y	5			-1	

- b) Draw the graph. Write down its line of symmetry.

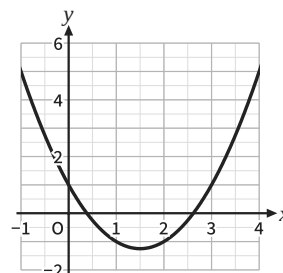


a) 5, -1, -3, -1, 5
 b) a smooth U curve, $x = 1$

7 Plotting quadratic graphs

The graph of $y = x^2 - 3x + 1$ is drawn.

- a) Use it to solve $x^2 - 3x + 1 = 3$.
 b) Find the value of k for which $x^2 - 3x + 1 = k$ has only one solution.



a) $y = 3$ meets it at $x = -0.6$ and 3.6 (± 0.1)
 b) the lowest point: $k = -1.25$ (-1.2 to -1.3)

8 Roots and turning points

The curve $y = x^2 + bx + c$ crosses the x axis at $x = -1$ and $x = 5$.

- a) Find the values of b and c .
 b) Find the coordinates of its turning point.

a) $(x + 1)(x - 5) = x^2 - 4x - 5$: $b = -4, c = -5$
 b) halfway: $x = 2, y = 4 - 8 - 5$
 $(2, -9)$