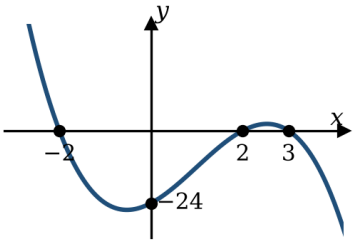
Day 353 **A Level Maths: A Tier 10-a-day**

1 A curve has equation $4x^2 + 2xy + 2y^2 = 28$.
Find the coordinates of the points where the tangent is parallel to the x-axis.

2 Summary statistics for the daily mean windspeed (knots) in the same month are:
Heathrow: mean 28.5, standard deviation 4.1;
Leuchars: mean 11.5, standard deviation 5.1.
Make two comparisons.

3 A and B have position vectors $\begin{pmatrix}4\\5\end{pmatrix}$ and $\begin{pmatrix}-2\\2\end{pmatrix}$.
The point P lies on AB with AP : PB = 2 : 1.
Find the position vector of P and the exact distance OP.

4 The diagram shows a sketch of the curve y = f(x), where f(x) is a cubic.
Find f(x), giving your answer in expanded form.



5 Use the trapezium rule with 3 strips to estimate $\int_1^7 \sqrt{x+3}\,dx$, giving your answer to 3 s.f.
State, with a reason, whether your estimate is an overestimate or an underestimate.

Day 353	A Level Maths: A Tier 10-a-day
6 A particle slides from rest down a rough plane inclined at α to the horizontal, where $\tan \alpha = \frac{3}{4}$. It moves 49 m in 5 s. Find (a) the coefficient of friction, (b) the speed after 5 s. Take g = 9.8.	
7 X ~ Po(40). Use a suitable approximation to find P(X ≥ 38), to 3 significant figures.	
8 $f(x) = x^2 + 6x + 2$. (a) Write f(x) in the form $a(x + p)^2 + q$. (b) State the minimum value of f(x) and the value of x at which it occurs. (c) Solve f(x) = 0, giving surds in simplest form.	
9 At t = 0, P and Q have position vectors $(2\mathbf{i} - 4\mathbf{j})$ m and $(\mathbf{i} + 3\mathbf{j})$ m and velocities $(-6\mathbf{i} + 5\mathbf{j})$ m s^{-1} and $(-2\mathbf{i} + 2\mathbf{j})$ m s^{-1}. Find (a) the time when they are closest, (b) the least distance between them.	
10 The line $4x - 3y = -5$ meets the circle $(x + 3)^2 + (y - 2)^2 = 36$ at the points A and B. Find the exact length of AB.	