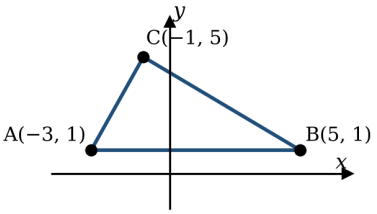
Day 260 **A Level Maths: A Tier 10-a-day**

1 A charity raises £600 in its first year and in each later year raises £30 more than in the previous year.
(a) How much does it raise in year 11? (b) In which year does the total raised first exceed £5000?

2 P(A) = 0.25, P(B) = 0.6 and P(A ∩ B) = 0.05. Find
(a) P(A ∪ B)
(b) P(A | B)
(c) P(A′ ∩ B′)

3 $y = x \sec(2x)$.
Find the exact gradient at $x = \frac{\pi}{6}$.

4 The diagram shows triangle ABC.
(a) Find the equation of the line through C perpendicular to AB.
(b) Hence find the coordinates of D, the foot of the perpendicular from C to AB, and the area of triangle ABC.



5 A particle slides from rest down a rough plane inclined at α to the horizontal, where $\tan\alpha = \frac{7}{24}$. It moves 10.78 m in 5 s. Find (a) the coefficient of friction, (b) the speed after 5 s. Take g = 9.8.

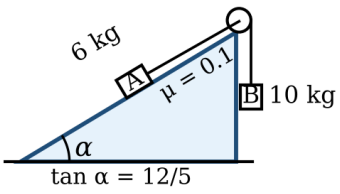
Day 260 **A Level Maths: A Tier 10-a-day**

6 The mean time taken (minutes) is normally distributed with standard deviation 10; it was previously 44.
A random sample of 36 has mean 42.1.
Test, at the 5% level, whether the mean has changed.

7 A curve has parametric equations $x = 2t + 1$, $y = t^2 - 4t$.
Find $\frac{dy}{dx}$ in terms of t, and the equation of the normal at the point where $t = -\frac{1}{2}$, in the form $ax + by + c = 0$ (integers).

8 The curve $y = f(x)$, where $f(x) = \frac{3}{x+2} + 2$, is translated by $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$.
Write down the equations of the asymptotes of the new curve, and find where it crosses the x-axis.

9 The system is released from rest and A moves up the rough plane. Find (a) the acceleration, (b) the tension in the light string. Take $g = 9.8$. Give answers to 3 s.f. if not exact.



10 A curve has equation $2x^2 - xy + 4y^2 = 62$.
Find the coordinates of the points where the tangent is parallel to the x-axis.