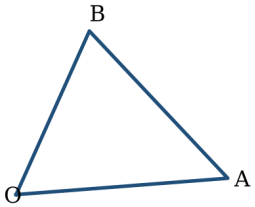
Day 274 **A Level Maths: B Tier 10-a-day**

1 50 students: 28 play football, 12 play tennis, 14 do neither.
(a) How many do both?
(b) Given a person who plays football, find P(this person plays tennis).

2 Simplify $\frac{(4x^3)^2 \times x^3}{8x^6}$.

3 In triangle OAB, OA = a and OB = b. M lies on AB with AM : MB = 2 : 1, and N lies on OB with ON : NB = 2 : 3.
Find OM and NM in terms of a and b.



4 Ordered data, texts sent in a day by 7 students: 14, 16, 16, 23, 32, 33, 38.
Find Q_1, Q_3, the IQR and any outliers (more than 1.5 × IQR beyond a quartile).

5 A has position vector $\begin{pmatrix} -2 \\ 4 \\ 2 \end{pmatrix}$ and B has position vector $\begin{pmatrix} 3 \\ -6 \\ -3 \end{pmatrix}$.
The point P lies on AB with AP : PB = 2 : 3.
Find the position vector of P.

Day 274	A Level Maths: B Tier 10-a-day
6 A block of mass 2 kg is released from rest on a rough plane inclined at angle α to the horizontal, where $\tan\alpha = \frac{5}{12}$. The coefficient of friction is 0.2. Take g = 9.8 m s^{-2}. Find the acceleration down the plane, and the distance moved in 3 s.	
7 Points A and B have position vectors $\begin{pmatrix} 0 \\ 0 \\ -4 \end{pmatrix}$ and $\begin{pmatrix} -10 \\ 2 \\ -15 \end{pmatrix}$. Find AB and the distance AB.	
8 A block of mass 4 kg is projected along a rough horizontal surface with speed 8.4 m s^{-1} and comes to rest after sliding 12 m. Take g = 9.8 m s^{-2}. Use work and energy to find the coefficient of friction.	
9 Prove by contradiction that there are no integers x and y such that $x^2 - y^2 = 30$.	
10 A is the point $(-2, -6)$ and B is the point (5, 1). Find the perpendicular bisector of AB as $ax + by + c = 0$, with integer a, b, c.	