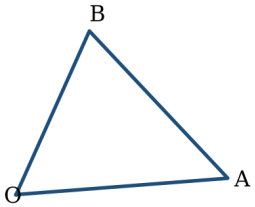
Day 298	A Level Maths: B Tier 10-a-day
1 Describe the single transformation that maps the graph of y = f(x) onto the graph of: (a) y = f(x) − 1 (b) y = −f(x)	
2 100 members: 42 swim, 44 cycle, 47 do neither. (a) How many do both? (b) Given a person who swims, find P(this person cycles).	
3 Find the quotient and the remainder when $-x^3 + x^2 - 3x - 10$ is divided by (x + 1).	
4 Large data set: maximum relative humidity (%) at Hurn has mean 91, sd 7. Outliers are more than 2 sd from the mean. Are the values 106 and 74 outliers?	
5 Differentiate y = 5 cot 3x with respect to x, and find the exact gradient when $x = \frac{\pi}{12}$.	

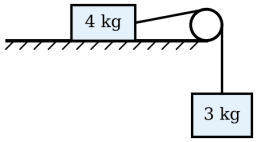
Day 298 **A Level Maths: B Tier 10-a-day**

6 A circle passes through A(5, 0) and B(−5, −10), and its centre lies on the x-axis. Find the centre and the equation of the circle.

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



8 A block of mass 4 kg lies on a rough horizontal table (coefficient of friction 0.5). It is joined by a light string over a smooth pulley to a particle of mass 3 kg hanging freely.
Take g = 9.8 m s^{-2}.
The system is released. Find the acceleration and the tension in the string.



9 For small θ (in radians), use the small angle approximations
to find the value of $\lim_{\theta \to 0} \frac{\tan 4\theta \sin 2\theta}{1 - \cos 4\theta}$.

10 A particle of mass 4 kg slides from rest down a smooth curved slope, starting 10 m above the bottom.
Take g = 9.8 m s^{-2}.
Use energy to find its speed at the bottom of the slope.