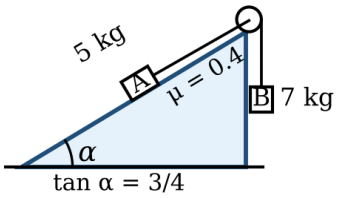
Day 264	A Level Maths: A Tier 10-a-day
1 Solve $\cos 2x + 2\sin x = -3$ for $-180° \leq x \leq 180°$.	
2 Solve $25^{3x+1} = 5^{3x-3}$.	
3 Summary statistics for the daily total rainfall (mm) in the same month are: Perth: mean 14, standard deviation 5.2; Jacksonville: mean 9, standard deviation 3.9. Make two comparisons.	
4 A uniform plank AB (mass 15 kg, length 4 m) rests horizontally on supports at C and D, where AC = 0.5 m and DB = 1.5 m. A 6 kg particle is placed at E, AE = x m, and the plank is about to tilt about D. Find x.	
5 The line l has equation $2x + y = -6$. (a) Find the coordinates of the foot of the perpendicular from P(−6, 3) to l. (b) Hence find the shortest distance from P to l, in exact form.	

Day 264 **A Level Maths: A Tier 10-a-day**

6 For a sample of 7 pairs of values of daily rainfall and ice cream sales, r = 0.9.
The critical value for a one-tailed test at the 1% level is 0.8329.
Test, at this level, whether there is positive correlation between the two variables.

7 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.



8 $l_1: \mathbf{r} = \begin{pmatrix} 5 \\ 5 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} 0 \\ 1 \\ -2 \end{pmatrix}$

$l_2: \mathbf{r} = \begin{pmatrix} -1 \\ 8 \\ 2 \end{pmatrix} + \mu \begin{pmatrix} 3 \\ -2 \\ 1 \end{pmatrix}$

Determine whether l_1 and l_2 intersect. If they do, find the point of intersection.

9 Water pours into a cone, vertex down, at 10 $cm^3 s^{-1}$. The surface radius is always $\frac{h}{3}$.

Find the rate at which the depth is rising when h = 2 cm.

10 A salary is £40000 in year 1 and increases by 3% each year.
In which year does the salary first exceed £80000?