Day 29	A Level Maths: S Tier 10-a-day
1 $g(x) = x^2 + 5$. Also $fg(x) = -3x^2 - 13$, where f is a linear function. (a) Find f(x). (b) Solve gf(x) = 30.	
2 Solve $2^{2x} - 21 \times 2^x + 80 = 0$, giving each answer exactly and, where not an integer, to 3 s.f.	
3 Solve $\sqrt{3x + 1} = 3x - 1$.	
4 (a) Show that $\cos^4\theta - \sin^4\theta \equiv \cos 2\theta$. (b) Hence solve $\cos^4\theta - \sin^4\theta = \frac{1}{2}$ for $0 \leq \theta < 360°$ (1 d.p.).	
5 Find the set of values of x for which both $x^2 + 4x > 0$ and $-2x + 8 \geq 11$.	

Day 29	A Level Maths: S Tier 10-a-day

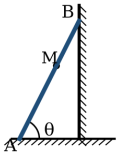
6 Particles A and B are projected from a point O at the same instant, with initial velocities (13**i** + 33**j**) m s^{-1} and (8**i** + 21**j**) m s^{-1} respectively (i horizontal, j vertically upwards).
Both are still in flight after 2 s. Find (a) the distance AB at this time, (b) the angle AB makes with the horizontal, to 1 d.p.

7 X ~ B(8, p). It is given that $P(X = 2) = \frac{3}{2} \times P(X = 1)$.
(a) Find the value of p.
(b) Find P(X = 0), correct to 3 significant figures.

8 Use a suitable trigonometric identity to find the exact value of

$$\int_0^{\pi/4} \sin 4x \cos x \, dx$$

9 A uniform ladder AB of length 10 m and weight 150 N has A on rough ground ($\mu = 0.6$) and B against a smooth vertical wall. It makes angle θ with the ground, $\tan\theta = \frac{4}{3}$.
A man of weight 600 N climbs the ladder. How far along the ladder can he go before it slips?



10 Two fair 6-sided dice, numbered 1 to 6, are rolled. M is the larger of the two scores.
(a) Show that $P(M = m) = \frac{(2m - 1)}{36}$ for m = 1, 2, ..., 6.
(b) Find P(M = 3) and E(M).