Day 194	A Level Maths: A Tier 10-a-day
1 |3| = 2, |b| = 2 and the angle between a and b is 30°. Find the exact values of a·b and |a + b|.	
2	A(16, −4) and B(−10, −4) are the ends of a diameter of a circle. (a) Find the equation of the circle, in the form $x^2 + y^2 + ax + by + c = 0$. (b) Show that C(−9, 1) lies on the circle.	
3	Solve $2\sin^2\theta - 3\cos\theta - 3 = 0$ for $-180° \leq \theta \leq 180°$.	
4	P(A) = 0.6 and P(A ∪ B) = 0.68. (a) Given that A and B are independent, find P(B). (b) Given instead that A and B are mutually exclusive, find P(B). (c) In the case in (a), find P(A′ ∩ B).	
5	(a) Express $\frac{-2x-7}{(x+2)^2}$ in the form $\frac{A}{x+2} + \frac{B}{(x+2)^2}$. (b) Hence find the exact value of $\int_0^4 \frac{-2x-7}{(x+2)^2}\,dx$.	

Day 194	A Level Maths: A Tier 10-a-day
6 A particle slides from rest down a rough plane inclined at α to the horizontal, where tan α = $\frac{7}{24}$. It moves 22.54 m in 5 s. Find (a) the coefficient of friction, (b) the speed after 5 s. Take g = 9.8.	
7 Buses arrive at a stop at random at an average of 8 per hour. Find the probability that in a 120-minute period there are (a) zero events (b) at least 1. (c) Find the probability that at least one occurs in each of two separate 120-minute periods.	
8 The line $3x - 4y = 22$ meets the circle $(x + 4)^2 + (y + 4)^2 = 36$ at the points A and B. Find the exact length of AB.	
9 In the expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is 14 and the coefficient of x^2 is 84. Find n and k.	
10 A ball is projected from a point O on horizontal ground at angle α above the horizontal, tan α = $\frac{12}{5}$, and passes through A, 10 m horizontally from O and 19.1 m above the ground. Find the speed of projection. Take g = 9.8.	