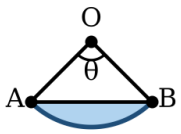
Day 106	A Level Maths: A Tier 10-a-day
1 The 3rd term of an arithmetic sequence is -14 and the 7th term is -22. Find the first term and common difference, and the sum of the first 30 terms.	
2 P(B) = 0.15, P(A) = 0.65 and P(A | B) = 0.5. (a) Find P(A ∩ B) and P(A ∪ B). (b) Find P(B | A). (c) Determine whether A and B are independent.	
3 A sector of a circle has area 11.25 cm^2 and angle 0.9 radians. Find the radius, the arc length and the perimeter of the sector.	
4 A circle has equation $x^2 + y^2 - 6x + 4y = 0$. (a) Find the centre and radius of the circle. (b) Determine whether P(2, 2) lies inside or outside the circle.	
5 Particle A (5 kg) lies on a rough table, $\mu = 0.2$, joined by a light string over a smooth pulley to particle B (3 kg), 1 m above the floor. Released from rest; B lands without rebounding. Find (a) the acceleration of A before B lands, (b) the further distance A moves. Take g = 9.8.	

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6 The circle has centre O and radius 4 cm. Angle AOB = $\frac{\pi}{2}$.
Find the exact area and the exact perimeter of the shaded segment.



7 Ball A is dropped from rest 73.5 m above the ground. At the same instant ball B is projected upwards at 24.5 m s^{-1} from the ground directly below A. Find (a) the time when they collide, (b) the height of the collision. Take g = 9.8.

8 Find the exact value of $\sin(\arcsin \frac{8}{17} + \arcsin \frac{7}{25})$.

9 In the expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is 9 and the coefficient of x^2 is 36.
Find n and k.

10 The mass of an egg is $N(77, 8^2)$. An egg is classed as 'special' if its mass is more than 86. 8 eggs are chosen at random. Find the probability that exactly 4 are special (3 s.f.).