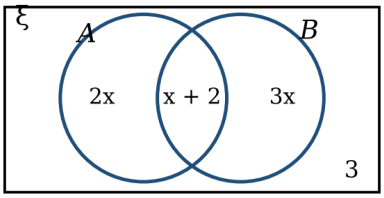
Day 57	A Level Maths: A Tier 10-a-day
1 A 4 kg particle rests on a rough plane inclined at α, $\tan\alpha = \frac{12}{5}$, $\mu = 0.5$. A force of P N acts up a line of greatest slope and the particle stays at rest. Find the range of values of P. Take g = 9.8. Give answers to 3 s.f. if not exact.	
2 Solve $x - 6\sqrt{x} + 5 = 0$.	
3 A club has 180 members: 100 Bronze, 30 Silver and 50 Gold. A stratified sample of size 18 is taken. Find the number of members sampled from each group.	
4 Solve $3^{2x-3} = 9^{3x+2}$.	
5 Find the exact value of $\sin(2 \arccos \frac{3}{5})$.	

Day 57 **A Level Maths: A Tier 10-a-day**

6 The Venn diagram shows the numbers of 35 students in sets A and B.
(a) Find the value of x.
(b) A student is chosen at random. Find P(A′ | B′).



7 The line l has equation $\mathbf{r} = \begin{pmatrix} 2 \\ -4 \\ -2 \end{pmatrix} + t\begin{pmatrix} 0 \\ 3 \\ 0 \end{pmatrix}$.
Find the coordinates of the foot of the perpendicular from P(3, −1, 0) to l, and the exact distance from P to l.

8 A sequence is defined by $u_1 = 5$ and $u_{n+1} = 1 - \frac{1}{u_n}$.
(a) Find u_2 and u_3.
(b) Find u_{99} and $\sum_{r=1}^{99} u_r$.

9 A driver at constant speed sees a hazard 99 m ahead. After a reaction time of 1 s she brakes with deceleration 2 m s^{-2} and stops exactly at the hazard. Find (a) her initial speed, (b) the total time from seeing the hazard to stopping.

10 |a| = 3, |b| = 8 and the angle between a and b is 120°.
Find the exact values of a·b and |a + b|.