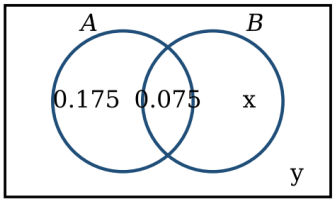
Day 196	A Level Maths: B Tier 10-a-day
1 A train moves in a straight line with constant acceleration. Its final speed is 19 m s^{-1}, its acceleration is 3 m s^{-2} and the motion lasts 4 s. Find the initial speed.	
2 Find the exact value of $\int_0^1 (3x + 4e^{2x})\,dx$.	
3 Evaluate $\sum_{r=7}^{20}(6r + 3)$.	
4 A sledge of mass 5 kg is pulled across smooth horizontal ice by a rope with tension 30 N, inclined at α above the horizontal, where $\tan\alpha = \frac{4}{3}$. Take g = 9.8 m s^{-2}. Find (a) the acceleration of the sledge, (b) the normal reaction of the ice.	
5 $f(x) = 2x^3 + kx + 12$. Given that $(x + 3)$ is a factor of f(x), (a) find the value of k, (b) factorise f(x) completely.	

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6 The Venn diagram shows probabilities for events A and B, which are independent. Find the values of x and y.



7 Solve $4^{2x+4} = 2^{x-1}$.

8 Given that each attempt at a task succeeds independently with probability 0.2, find the least number of attempts needed for the probability of at least one success to exceed 0.99.

9 Given that $5\cos\theta + 12\sin\theta \equiv 13\cos(\theta - 67.4°)$,
solve $5\cos\theta + 12\sin\theta = 4$ for $0 \leq \theta \leq 360°$.
(1 d.p.)

10 Differentiate $y = 3\cot x$ with respect to x,
and find the exact gradient when $x = \frac{\pi}{6}$.