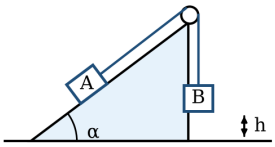
Day 307	A Level Maths: S Tier 10-a-day
1 Solve $\tan(\theta - 20°) = \sqrt{3}$ for $-180° \leq \theta \leq 180°$.	
2 Solve $\sqrt{x + 2} = x - 4$.	
3 A particle of weight W N is on a rough plane inclined at α to the horizontal, where $\sin\alpha = \frac{3}{5}$. A force P N acts up a line of greatest slope; the particle stays at rest for $10.8 \leq P \leq 25.2$. Find (a) W, (b) the coefficient of friction, (c) the acceleration when P = 50.4. Take g = 9.8 m s^{-2}.	
4 Faults in a cable occur at random at a mean rate of 4 per week. After a modification, 2 faults are found in 1 week. Test at the 5% level whether the rate of faults has decreased.	
5 Find the set of values of x for which both $x^2 - 11x + 28 \geq 0$ and $3x - 8 < 10$.	

Day 307 **A Level Maths: S Tier 10-a-day**

6 Particles A (6 kg) and B (10 kg) are joined by a light string over a smooth pulley (see diagram). A lies on a smooth slope, $\sin\alpha = \frac{3}{5}$, and B is 3.75 m above the ground.
Released from rest, find the further distance A moves up the slope after B lands (A does not reach the pulley).



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

$$\int_0^{\pi/6} \sin^4 3x \, dx$$

8 Find the binomial expansion of $(9 - 5x)^{-\frac{3}{2}}$ in ascending powers of x up to and including the term in x^3.
State the values of x for which it is valid.

9 The points A, B, C have coordinates $(-3, 0, 3)$, $(-1, 0, -1)$, $(-2, 5, 3)$.
Find angle ABC to 1 d.p., and the exact area of triangle ABC.

10 $X \sim N(\mu, 64)$. H_0: $\mu = 100$ is tested against H_1: $\mu > 100$ using the mean of a sample of size 25 at the 1% level.
(a) Find the critical region for the sample mean.
(b) Find the probability of a Type II error when $\mu = 103$.