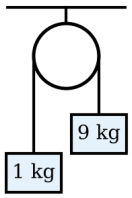
Day 290	A Level Maths: B Tier 10-a-day
1 Solve $-3x + 6 \leq -2x + 10$.	
2 Find the exact value of $\int_1^2 (4e^{3x} + \frac{4}{x})\, dx$.	
3 The points A and B have coordinates $(-2, 6)$ and $(8, 8)$. (a) Find the midpoint of AB. (b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.	
4 A particle moves in a straight line. At time t seconds its acceleration is $t + 4$ m s^{-2}. When $t = 0$ the velocity is 1 m s^{-1}. Find the velocity when $t = 2$.	
5 The area of a square increases at a constant rate of 30 $cm^2 s^{-1}$. Find the rate of increase of the side length when the side is 4 cm.	

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6 Particles of mass 1 kg and 9 kg hang on a light string over a smooth fixed pulley, as shown, and are released from rest. Take $g = 9.8$ m s^{-2}. Find the acceleration and the tension in the string.



7 The line l has equation $y = x - 6$. The point P is $(1, -1)$.
(a) Find the line through P perpendicular to l, as $ax + by + c = 0$ with integer a, b, c.
(b) Find the foot F and the exact distance PF.

8 The continuous random variable X has pdf f(x) $= \frac{2x}{36}$ for $0 \leq x \leq 6$, and 0 otherwise.
(a) Find P(X > 1).
(b) Find the median of X, to 3 significant figures.

9 Find the exact value of

$$\int_0^{\ln 3} \frac{e^x}{e^x + 4}\,dx,$$

giving your answer in the form a ln b.

10 The time, X minutes, to complete a task is normally distributed with mean 50 and s.d. 12. A random sample of 4 is taken. Find the probability that the mean time is more than 62 (3 s.f.).