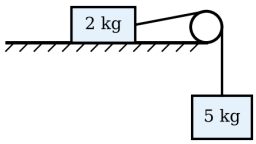
Day 23	A Level Maths: B Tier 10-a-day
1 Given that $y = (3x + 3)^6$, find $\frac{dy}{dx}$, and the gradient of the curve when $x = 1$.	
2 10 values of x are coded using $y = \frac{(x - 50)}{5}$. $\Sigma y = 5$ and $\Sigma y^2 = 131$. Find the mean and standard deviation of x (3 s.f.).	
3 A particle has velocity $(5\mathbf{i} + 3\mathbf{j})$ m s^{-1} at time t = 0 and moves with constant acceleration $(3\mathbf{j})$ m s^{-2}. Find its velocity and speed when t = 3.	
4 The line segment AB is a diameter of a circle, where A is $(-4, -3)$ and B is $(2, -9)$. Find an equation of the circle in the form $(x - a)^2 + (y - b)^2 = k$.	
5 Simplify cosec 4x + cot 4x, giving your answer as a single trigonometric term.	

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6 The mass, X g, of a loaf is normally distributed with mean 40 and s.d. 6.
A random sample of 4 is taken. Find the probability that the mean mass is more than 44.5 (3 s.f.).

7 The mass of a radioactive sample, M grams, after t days is $M = 50\,e^{-0.05t}$.
Find (a) the half-life, (b) the rate of decrease in mass when t = 5, each to 3 s.f.

8 A block of mass 2 kg lies on a rough horizontal table (coefficient of friction 0.3). It is joined by a light string over a smooth pulley to a particle of mass 5 kg hanging freely.
Take $g = 9.8$ m s^{-2}.
The system is released. Find the acceleration and the tension in the string.



9 (a) Expand $(1 - x)^{-\frac{1}{2}}$ in ascending powers of x up to and including the term in x^3.
(b) State the range of values of x for which the expansion is valid.

10 Solve $(x - 3)(x - 5)x \leq 0$.