Day 348	A Level Maths: C Tier 10-a-day
1 Differentiate with respect to x: (a) 3 cos 4x (b) e^{3x} + sin 4x	
2 Prove that the sum of the squares of two integers that differ by 5 is always odd.	
3 A particle of weight 60 N hangs from a light string, pulled aside by a horizontal force P N so that the string makes an angle θ with the vertical, where $\tan\theta = \frac{5}{12}$. Find P and the tension T N.	
4 Solve $\sin 3x = -\frac{\sqrt{2}}{2}$ for $0° \leq x \leq 120°$.	
5 In a histogram, the class 40 to 60 has frequency 15 and is drawn with a bar of height 2 cm. The class 60 to 65 has frequency 15. Find the height of its bar.	

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6 A particle has initial velocity $(2\mathbf{i} + 2\mathbf{j})$ m s^{-1} and constant acceleration $(-2\mathbf{i} + 2\mathbf{j})$ m s^{-2}.
Find its velocity after 3 s.

7 8 pairs of data on height and arm span have r = 0.65.
Test, at the 5% significance level, for evidence of correlation. The critical value is ±0.7067.

8 Express $\frac{5x + 6}{(x + 3)^2}$ in the form $\frac{A}{(x + 3)} + \frac{B}{(x + 3)^2}$.

9 $y = x^3 - 6x^2 - 1$.
Find the coordinates of the stationary points and determine their nature.

10 The diagram shows the graph of $y = \frac{k}{x - a} + c$ with its asymptotes. Find the values of a, c and k.

