Day 333	IGCSE 10-a-day
1 A particle P moves in a straight line. After t seconds its displacement from a fixed point O is s metres, where $s = -t^3 - 8t^2 + 12t$ $(t > 0)$ Find (a) the velocity of P, (b) the acceleration of P, when $t = 3$.	
2 The mean of 7 numbers is 115. One number is removed and the mean of the remaining 6 numbers is 126.5. Work out the number that was removed.	
3 Solve $12x^2 - 6 = x$	
4 $f(x) = 3x - 2$ and $g(x) = 3x^2 - 3x + 6$. (a) Find $f^{-1}g(x)$. (b) Work out $f^{-1}g(-3)$.	
5 The point A lies on the curve $y = 3x^2 - 5x - 4$ where $x = 0$. Find the equation of the normal at A. Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.	

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6 A right-angled triangle has base $(7 + \sqrt{7})$ cm and height $(7 - \sqrt{7})$ cm. Show that the area of the triangle is a rational number. Work out the area.	
7 x is an acute angle and $\sin x = \frac{5}{8}$. Find the exact value of (a) $\cos x$ (b) $\tan x$. Give each answer as a fraction, rationalising any denominator.	
8 A sector of a circle has radius 12 cm and angle 180°. The sector is made into a cone by joining the two straight edges together. (a) Work out the radius of the base of the cone. (b) Work out the exact volume of the cone. Give your answer in terms of π, as a surd if necessary.	
9 Alloy A holds copper and tin in the ratio 2 : 1. Alloy B holds copper and tin in the ratio 3 : 2. 24 kg from alloy A is mixed with some of alloy B. The ratio of copper to tin in the mixture is 17 : 10. Work out how many kg were taken from alloy B.	
10 A ball is thrown upwards. Its height above the ground, h metres, after t seconds is given by $h = -3t^2 + 24t + 5$ (a) Work out the greatest height reached by the ball. (b) Work out the velocity of the ball when t = 7. State whether it is moving up or down.	