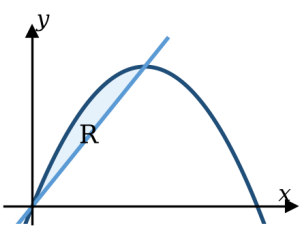
Day 282	A Level Maths: B Tier 10-a-day
1 Find the exact value of cosec 30°, giving your answer with a rational denominator.	
2 Ordered data, texts sent in a day by 8 students: 12, 13, 16, 17, 23, 39, 39, 40. Find Q_1, Q_3, the IQR and any outliers (more than 1.5 × IQR beyond a quartile).	
3 In the binomial expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is 8 and the coefficient of x^2 is 24. Find the values of n and k.	
4 A particle moves on a straight line. Its displacement from O at time t seconds is $s = 3t^3 - 4t^2 + 4t$ metres. Find its velocity and acceleration when t = 3.	
5 The diagram shows the curve $y = x(4 - x)$ and the line $y = 2x$. Find the exact area of the shaded region R. 	

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6 A rocket is projected from ground level with initial velocity components 20 m s^{-1} horizontally and 39.2 m s^{-1} vertically upwards. Take g = 9.8 m s^{-2}. Find (a) the greatest height, (b) the speed at the greatest height.	
7 Packet masses are normal, s.d. 4 g. Claimed mean 50 g; 40 packets have mean 50.9 g. Test at the 5% level whether the true mean is greater than 50.	
8 The mass of a radioactive sample, M grams, after t days is $M = 50\,e^{-0.2t}$. Find (a) the half-life, (b) the rate of decrease in mass when t = 5, each to 3 s.f.	
9 Solve $3 \leq 4x - 4 < 12$.	
10 The line l has equation y = 2x + 10. The point P is (−5, 5). (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.	