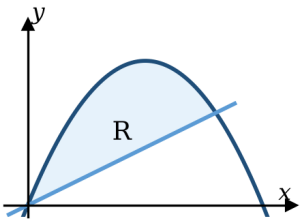
Day 171	A Level Maths: B Tier 10-a-day
1 Items numbered 1 to 117; systematic sample of size 13. (a) Find the sampling interval. (b) The first item is number 5. Find the 6-th item.	
2 A ship moves with constant velocity $(3\mathbf{i} - \mathbf{j})$ m s^{-1}. At time t = 0 its position vector relative to a fixed origin O is $(-7\mathbf{i} + 6\mathbf{j})$ m. Find (a) its position vector when t = 4, (b) the value of t when it crosses the line through O in the direction of $\mathbf{i}$.	
3 Statement: "The sum of two irrational numbers is always irrational." Use the numbers $2 + \sqrt{2}$ and $6 - \sqrt{2}$ to show this is false.	
4 Solve $\cot^2 x - \operatorname{cosec} x - 5 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p.	
5 Find the quotient and the remainder when $3x^3 - 4x^2 - 12x + 14$ is divided by $(x - 2)$.	

Day 171 **A Level Maths: B Tier 10-a-day**

6 A class of width 20, frequency 40, is a bar 4 cm wide, 5 cm tall.
(a) Find the bar height for width 20, frequency 45.
(b) Find the frequency of a 1 cm by 3 cm bar.

7 The diagram shows the curve $y = x(5 - x)$ and the line $y = x$.
Find the exact area of the shaded region R.



8 A particle moves in a straight line. At time t s its velocity is $v = 20t - 2t^2$ m s^{-1}, for $t \geq 0$.
Find the maximum speed of the particle and the time at which it occurs.

9 Given that $\tan \theta = 2$ and θ is acute,
find the exact value of $\operatorname{cosec} \theta$.

10 The curve C has equation $y = x^2 - 2x + 4$.
C is translated by $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$.
Find its new equation.