Eddie Price **Quiz 4 Solutions** **Summer 2018**

High score: 20; (nonzero) Low score: 2; Average score: 12.55

Problem 1 (20 Points). Set up **but do not evaluate** an iterated integral to compute $\iint_D y^2\,dA$ where D is the triangular region with vertices $(0,1)$, $(1,2)$, $(4,1)$.

Solution.

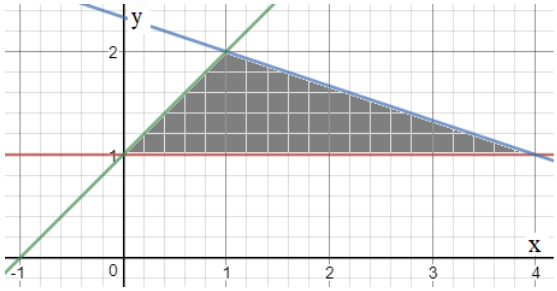

Figure 1: Image made in Desmos and Paint

Notice that we would need to split this up into two double integrals if we did $dy\,dx$, so we will do $dx\,dy$.

The blue line contains the points $(1,2)$ and $(4,1)$, so it has a slope $\frac{1-2}{4-1} = -\frac{1}{3}$. Hence, the line has equation $y-2 = -\frac{1}{3}(x-1)$. Solving for x, we get $-3y+6 = x-1$ or $x = -3y+7$.

The green line contains the points $(0,1)$ and $(1,2)$, so it has a slope $\frac{2-1}{1-0} = 1$. Hence, the line has equation $y-1 = x$. So $x = y-1$.

We see that D is bounded on the left by curve $x = y-1$ and on the right by curve $x = -3y+7$. The minimum y-value in D is 1, and the maximum y-value in D is 2. Hence, we get the iterated integral

$$\boxed{\int_1^2 \int_{y-1}^{-3y+7} y^2\,dx\,dy}$$