Worksheet for October 10

Problems marked with an asterisk are to be placed in your math diary.

(1.*). Calculate $\int\int_R x^2 + 2xy^2 + 2 \, dA$, where R is the region bounded by the graph of $y = -x^2 + x$, and the lines $x = 0$ and $x = 2$.

(2.*) Calculate the volume of the solid region in $\mathbb{R}^3$ bounded above by the graph of $z = x^2 + y^2$ and the planes $x = 0$, $y = 0$, $z = 0$ and $3x + 4y = 10$.

(3) Explain why $\int\int_D \, dA = \text{area}(A)$. Use this to compute the area of a circle of radius r.

(4.*) Let R denote the region in $\mathbb{R}^2$ bounded by the graphs of: $x = y^2$, $x = 4$, $y = 0$. Set $f(x, y) = y\cos(x^2)$.

(i) Graph the region R.

(ii) Set up $\int\int_R f(x, y) \, dA$ in two ways, viewing R as a region of Type 1 and Type 2.

(iii) Evaluate $\int\int_R f(x, y) \, dA$. Can you evaluate this in two ways, using your answers from part (ii)?