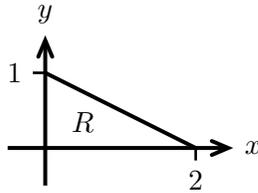# Limits for double integrals

1. Evaluate $\iint_R x \, dA$, where R is the finite region bounded by the axes and $2y + x = 2$.

Answer:

First we sketch the region.

Next, we find limits of integration. By using vertical stripes we get limits

Inner: y goes from 0 to $1 - x/2$;   outer: x goes from 0 to 2.

Thus the integral is

$$\int_0^2 \int_0^{1-x/2} x \, dy \, dx$$

Finally, we compute the inner, then the outer integrals.

Inner: $xy\big|_0^{1-x/2} = x - \dfrac{x^2}{2}$.

Outer: $\dfrac{x^2}{2} - \dfrac{x^3}{6}\bigg|_0^2 = \dfrac{2}{3}$.

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18.02SC Multivariable Calculus
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