

15.2, number 41: Sketch the region of integration for

$$\int_0^1 \int_2^{4-2x} dy dx.$$

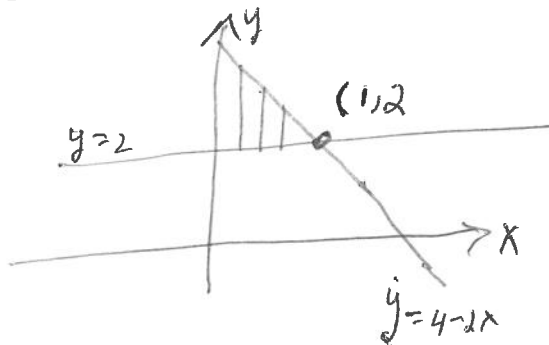
Set up the integral over the same region, with the order of integration reversed.

**Answer:** For each fixed  $x$  with  $0 \leq x \leq 1$ ,  $y$  goes from  $y = 2$  to  $y = 4 - 2x$ . We draw  $y = 2$  and  $y = 4 - 2x$ . We see that these lines intersect at  $(1, 2)$ . We have filled up the triangle with vertical lines. Please look at the picture.

Picture 15.2 Number 41

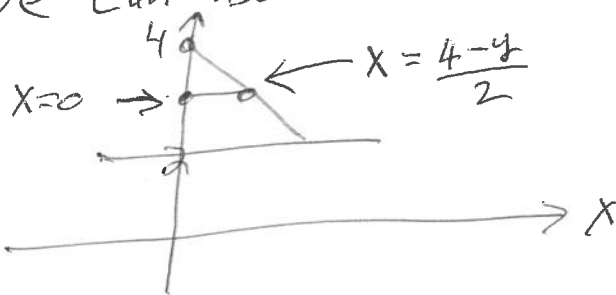
The integral  $\int_0^1 \int_2^{4-2x} dy dx$  is taken over

the triangle



For each fixed  $x$  with  $0 \leq x \leq 1$ ,  $y$  goes from  $y=2$  to  $y=4-2x$ .

We can also look at the region



For each fixed  $y$  with  $2 \leq y \leq 4$ ,  $x$  goes from  $x=0$  to  $x = \frac{4-y}{2}$ .

The integral is

$$\int_2^4 \int_0^{\frac{4-y}{2}} dx dy$$