1

$$f(x,y) = \cos(2x+y)$$
  $D = \{rac{1}{2} \le x \le rac{\pi}{2}, 1 \le y \le 2x\}$ 

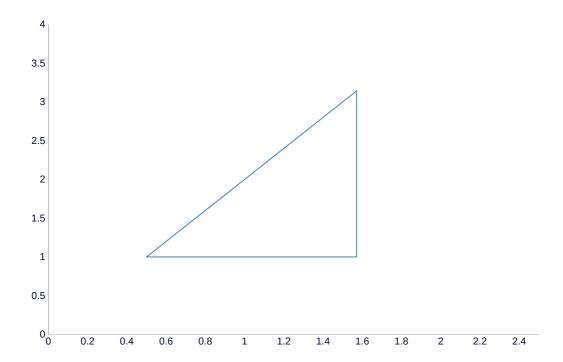
a

$$egin{aligned} a &= \iint\limits_D f(x,y) dA = \iint\limits_D \cos(2x+y) dA \ &= \iint\limits_{1/2} \int\limits_1^{\pi/2} \cos(2x+y) dy \ dx \end{aligned}$$

b

$$\int\limits_{1/2}^{\pi/2} \int\limits_{1}^{2x} \cos(2x+y) dy \ dx = \int\limits_{1/2}^{\pi/2} \sin(2x+y) \Big|_{y=1}^{2x} dx$$
 $= \int\limits_{1/2}^{\pi/2} \sin(4x) - \sin(2x+1) dx$ 
 $= \cos(2x+1)/2 - \cos(4x)/4 \Big|_{1/2}^{\pi/2}$ 
 $= \cos(\pi+1)/2 - \cos(2\pi)/4 + \cos(2)/2 - \cos(2)/2$ 
 $= \cos(\pi+1)/2 - \cos(2\pi)/4$ 
 $pprox -0.520$ 

C



Slanted: y = 2x

Bottom: y = 1

Right:  $x=\pi/2$ 

## 2

$$a=\int\limits_{1}^{\pi}\int\limits_{y/2}^{1}\cos(2x+y)dx\;dy$$

## 3

$$r=\sqrt{x^2+y^2}$$

$$\theta = \arctan(\frac{y}{x})$$

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$y=1\iff r\sin\theta=1\iff r=1/\sin\theta$$

$$x=\pi/2\iff r\cos\theta=\pi/2\iff r=\pi/2\cos\theta$$

$$a = \int \limits_{rctan(2/\pi)}^{rctan(2)} \int \limits_{1/\sin heta}^{\pi/2\cos heta} \cos(2r\cos heta + r\sin heta) dr\ d heta$$