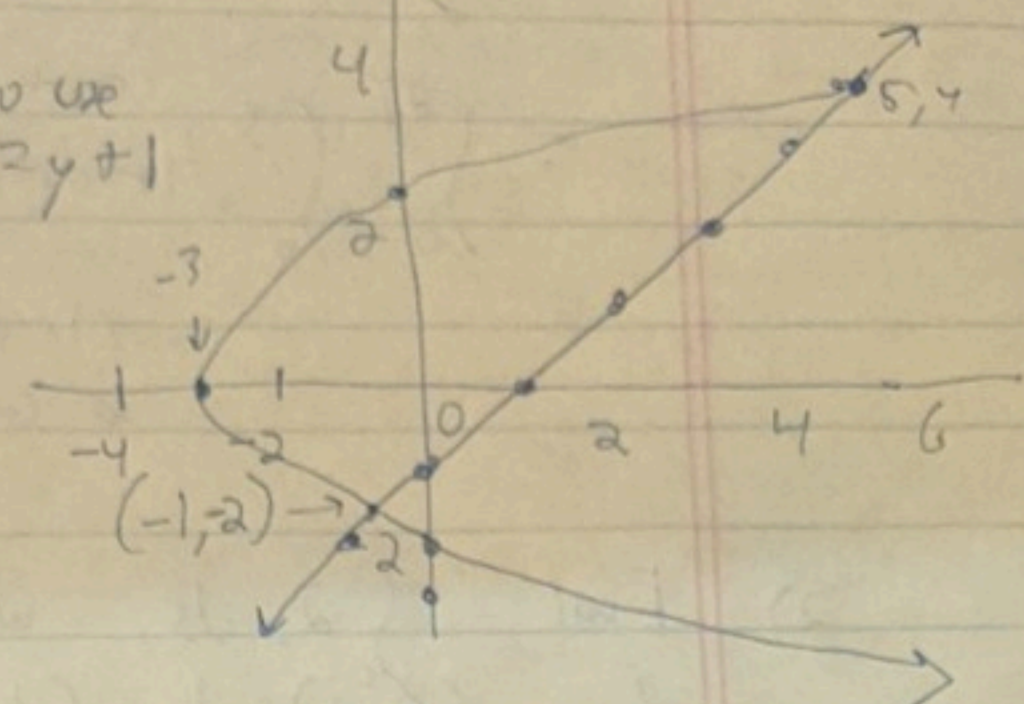
$$\int_{-1}^{5}\int_{x-1}^{2x+6} x y \, dy \, dx$$ inside has to be $x =$ ..., so use $x = 2y+1$



$$= \int_{-1}^{5}\int_{x-1}^{2x+6} (y+1)(y) \, dy \, dx$$

$$= \int_{-1}^{5}\int_{-2}^{4} y^2 + y \, dy \, dx \quad ?$$

can you help?

$$= \int_{-1}^{5} \left[\frac{y^3}{3} + \frac{y^2}{2} \right]_{-2}^{4} dx$$

is this right so far?

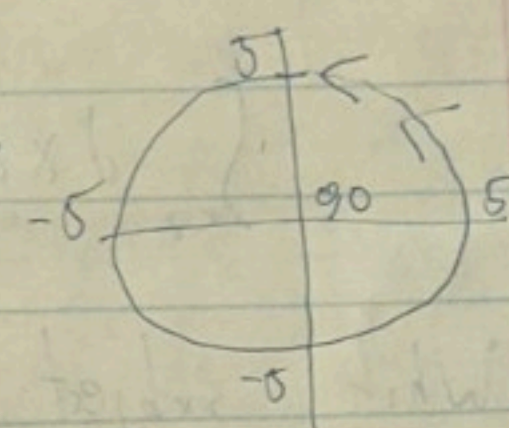
Did I set this up right?

$\boxed{\text{Module 7 Quiz 4 Retake}}$

1) $\int_C (x^2 - y^2)\, ds$ where C is $x = 5\cos t$ $y = 5\sin t$ $0 \le t \le 2\pi$

circle w/ radius 5 centered?

this is just a line integral w/ no vector field ... not covered in the material!! But fine



$x'(t) = -5\sin t$ $y'(t) = 5\cos t$

$f(x(t), y(t)) = 25\cos^2 t - 25\sin^2 t$

so... $\int_0^{2\pi} (25\cos^2 t - 25\sin^2 t) \sqrt{25\sin^2 t + 25\cos^2 t}$ $= 125 \int_0^{2\pi} (\cos^2 t - \sin^2 t)\, dt$

$\sqrt{\ } = 5$

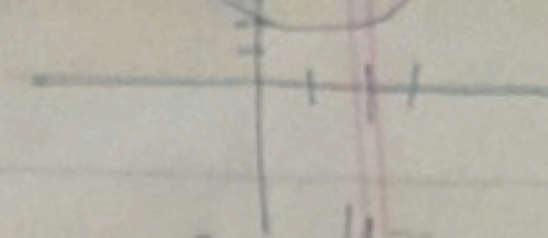
$\cos 2x$ and

$\int \cos 2x \, dx$ let $2x = u$, $\frac{du}{2} = dx$

$= \frac{1}{2}\int \cos u \, du$

$= \frac{1}{2}\sin u \, du$ sub $u = 2x$

$$= 125 \left[\frac{1}{2}\sin 2x \right]_0^{2\pi} = 0$$



$$\iint_D 2-3\,dy\,dx = -\int_0^{2\pi}\int_0^{2} 1\, r\,dr\,d\theta$$

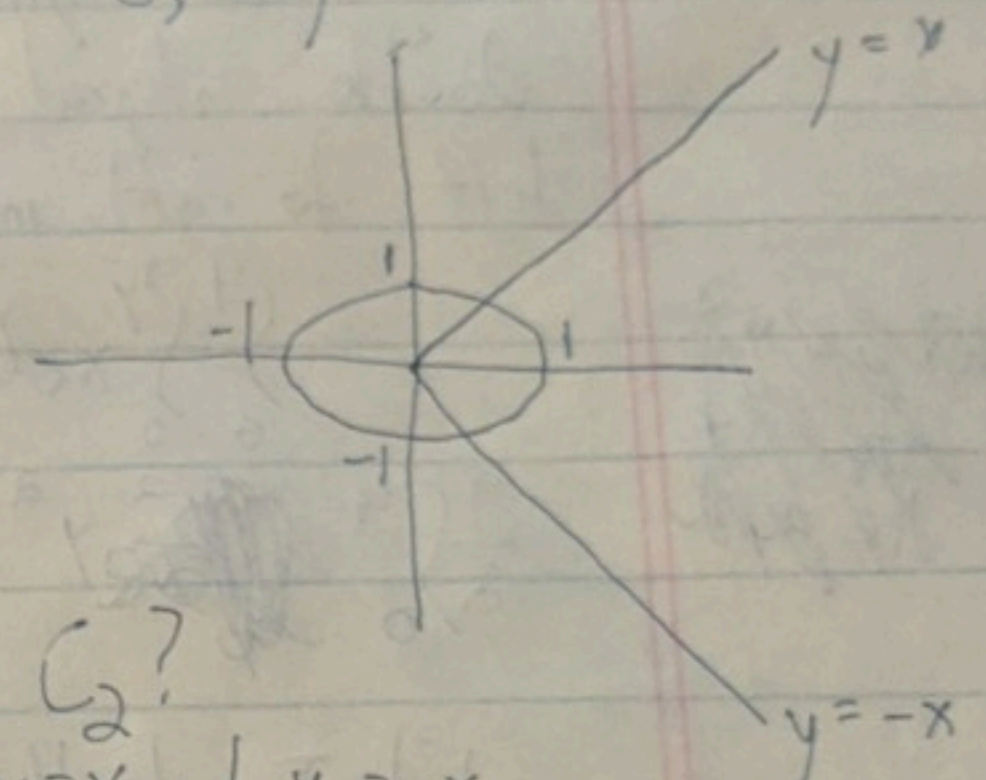
D is interior of C

$$= -\int_0^{2\pi} \frac{r^2}{2}\Big]_0^2 \,d\theta = -\int_0^{2\pi} 2\,d\theta$$

$$= -\,2\theta\Big]_0^{2\pi} = \boxed{4\pi}$$

same thing as $x^2+y^2=4$ right?

4) force $F(x,y) = (-16y + \sin x^2)\,i + (4e^{y^2} + 3x^2)\,j$
acts on particle travelling around C where
$C_1: y = x$
$C_2: x^2+y^2=1$
$C_3: y=-x$
Use Green's theorem to find work done by F on particle.



$x = \cos\theta$
$y = \sin\theta$

$\frac{d}{dx}F_2 = 6x \qquad \frac{d}{dy}F_1 = -16$

$$\iint_R 6x+16\,dx\,dy$$

what is C?
is it just C_2?
or also $y=x$ and $y=-x$
I think so but what are the limits of integration?
the two curves make an L
So maybe it's just $\int_0^1\int_0^1 \frac{F_2}{dx} - \frac{F_1}{dy}\,dx$?

$$\int_0^{2\pi}\int_0^{1} 6\cos\theta + 16\, r\,dr\,d\theta$$

$$\int_0^{2\pi} 6\sin\theta + 16\,r\Big]_0^1 \,d\theta$$

?

$$\int_0^{2\pi} 6\sin\theta + 16 - 6\sin\theta\,d\theta$$

$$\int_0^{2\pi} 16\,d\theta$$

$$16\theta\Big]_0^{2\pi} = \boxed{32\pi}$$

$\boxed{\text{Module 6 Quiz 4 retake}}$

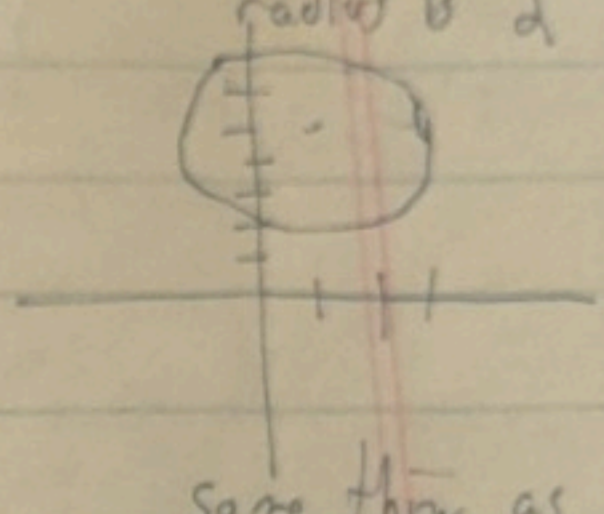
3) Eval $\int_C x^5+3y\,dx + (2x-e^{y^3})\,dy$ where C is $(x-1)^2+(y-5)^2=4$

Change to Polar after applying Green's theorem

radius is 2

$P=x^5+3y$ $\quad Q=2x-e^{y^3}$

$\frac{\partial P}{\partial y}=3$ $\quad \frac{\partial Q}{\partial x}=2$



$\iint_D 2-3\,dy\,dx = -\int_0^{2\pi}\int_0^2 1r\,dr\,d\theta$

D is interior of C

Same thing as $x^2+y^2=4$ right?

$= -\int_0^{2\pi} \frac{r^2}{2}\Big]_0^2 d\theta = -\int_0^{2\pi} 2\,d\theta$

$= -2\theta\Big]_0^{2\pi} = \boxed{4\pi}$

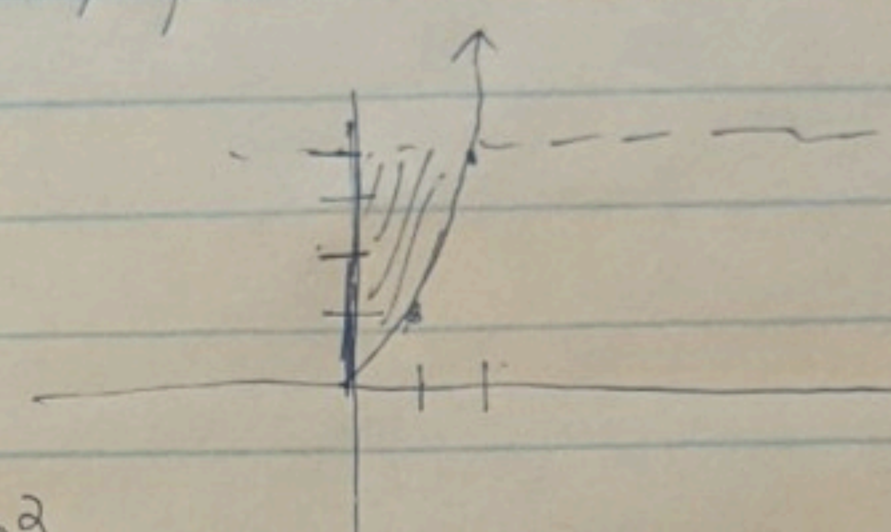
$\int_0^2\int_{-3}^{3}\int_{-1}^{1} 2x+2z \, dx \, dy \, dz$

10.9.1) Eval $\iint \text{curl } F \cdot n \, dA$ for F and S

$F=[z^2, -x^2, 0]$ S w/ vertices $(0,0,0)$ $(1,0,0)$ $(0,4,4)$ $(1,4,4)$
rectangle

$\boxed{\text{Module 6 retake quiz 4 continued}}$

2) Eval $\iint_R x e^{y^2}$ whe R is region in the first quadrant bounded by the graphs of $y=x^2$, $x=0$, $y=4$, eval from left to right



double integral problem lez goo....

left to right means dx first

$$\int_0^4\int_0^{\sqrt{y}} x e^{y^2} \, dx \, dy$$

$$\frac{1}{2}\int_0^4 \left[x^2 e^{y^2}\right]_0^{\sqrt{y}} dy$$

did I set this up right? for the inner integral why can't the upper bound be 2? why is it $\sqrt{y}$? if it was 2 it would be a rectangle right?

u sub

$$\frac{1}{2}\int_0^4 x^2 e^{y^2}\Big]_0^{\sqrt{y}} dy = \frac{1}{2}\int_0^4 y e^{y^2} dy$$

let $u=y^2$

$\frac{du}{dy}=2y$

$du = 2y\,dy$

$\frac{du}{2} = y\,dy$

$$=\frac{1}{2}\int_0^4 \frac{1}{2} e^u \, du = \frac{1}{2}\cdot\frac{1}{2} e^u\Big]_0^4 = \frac{1}{4} e^{y^2}\Big]_0^4$$

sub back

$$\boxed{\frac{1}{4}e^{256}-\frac{1}{4}}$$