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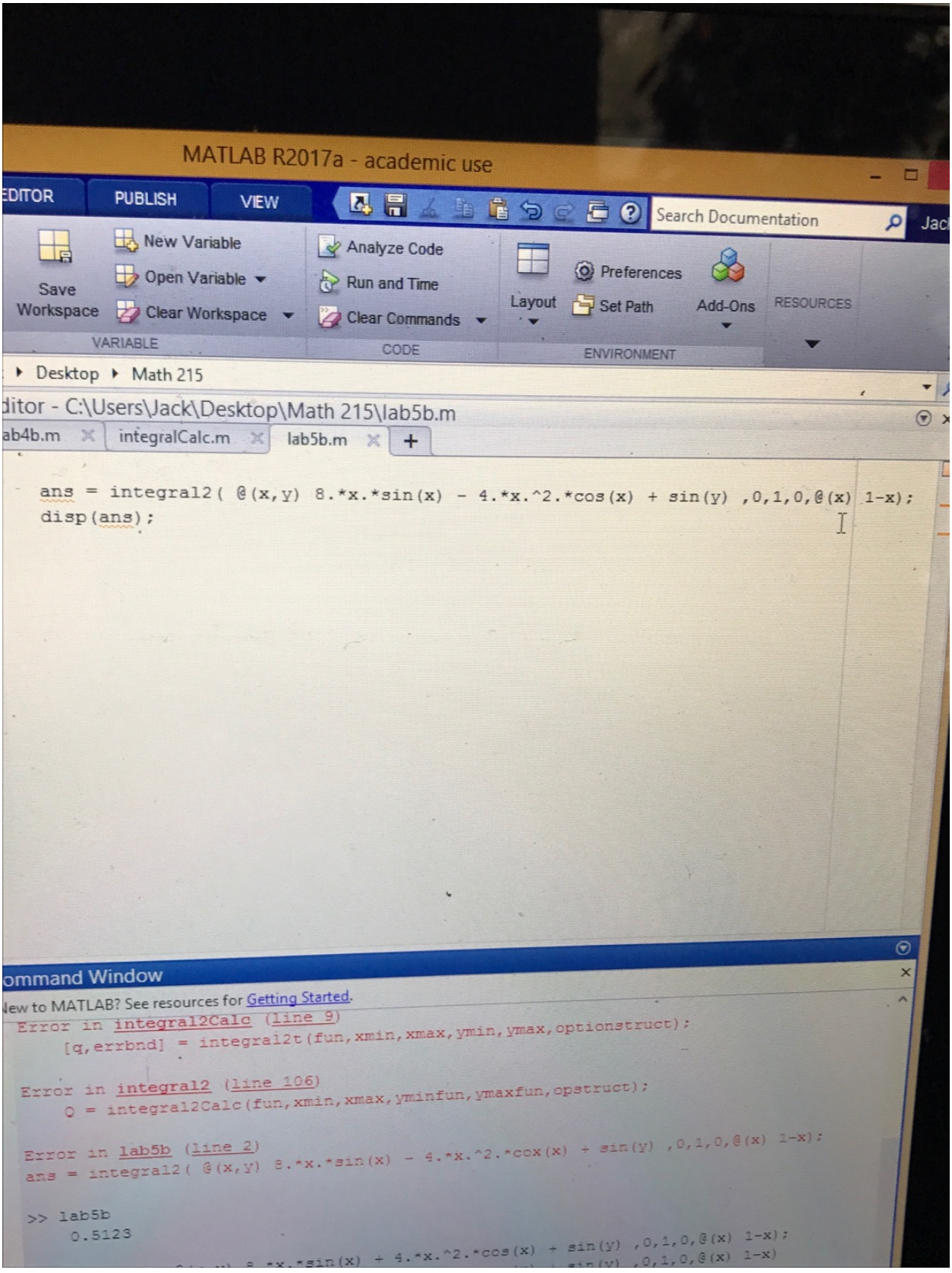
Lab 5

Exercise One

```
>> integral(@(t) 2.718.^t.*log(5+t)+1,0,1)

ans =

    3.9523

>> integral(@(t) -1.*(2.718.^(1-t).*log(6-t))+4.*(1-t).^2.*sin(1-t)-2.718.^(sin(t)),0,1)

ans =

   -3.6911

>> integral(@(t) 2.718.^(sin(1-t)),0,1)

ans =

    1.6318

>> 3.9523-3.6911+1.6318

ans =

    1.8930

fx >>
```

Exercise one via line integrals

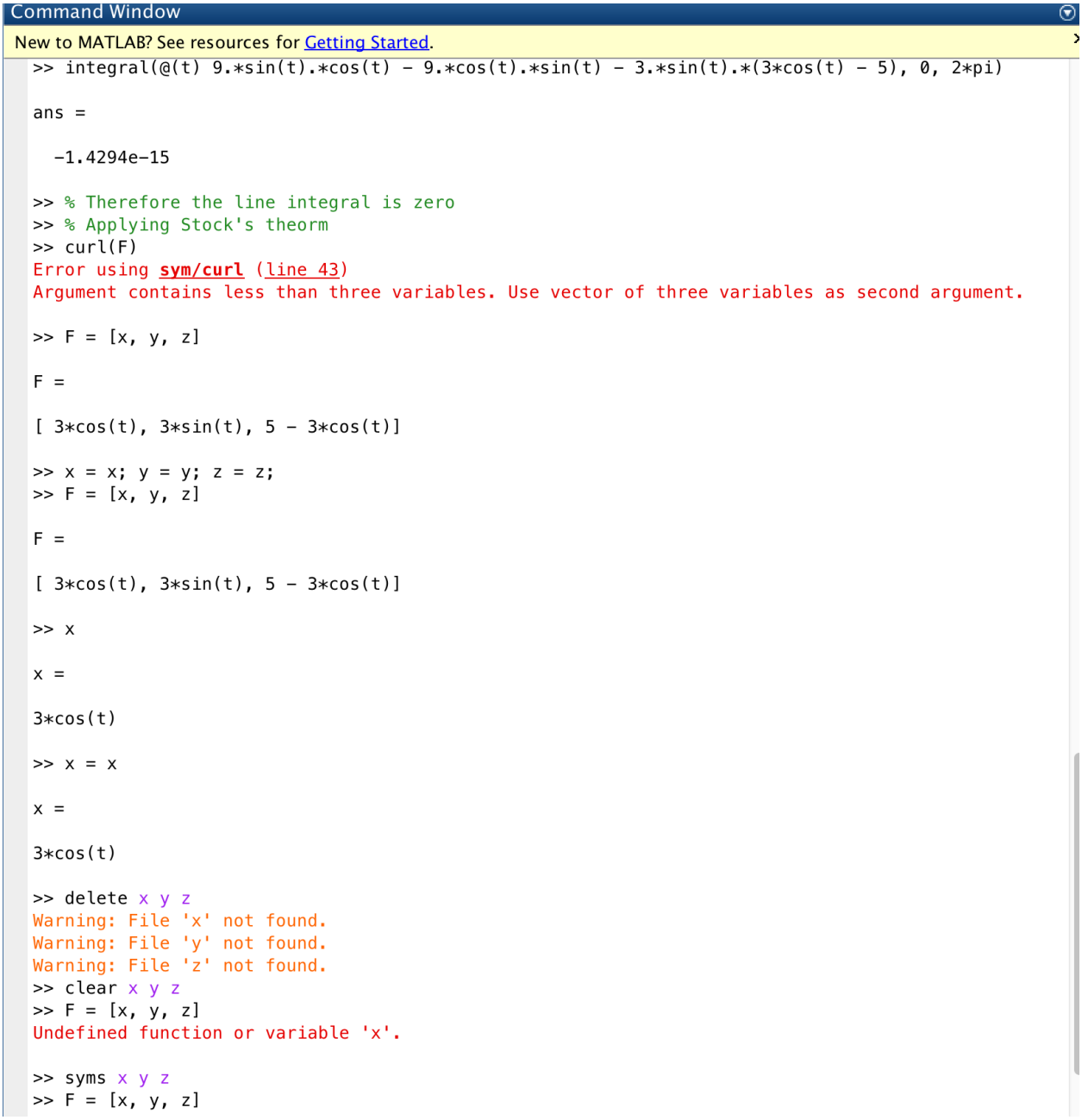


Exercise one via Green's Theorem

Exercise Two

```
>> F = [x, y, z];
>> % curve of intersection lies above circle with radius 3 centered at orgin
>> % paramatizing the plane
>> z = 5 - x

z =

5 - x

>> syms t
>> x = 3cos(t);
 x = 3cos(t);
       ↑
Error: Unexpected MATLAB expression.

Did you mean:
>> x = 3*cos(t);
>> y = 3*sin(t);
>> z = 5 - 3*cos(t);
>> % integrate
>> F = [x, y, z]

F =

[ 3*cos(t), 3*sin(t), 5 - 3*cos(t)]

>> syms dr
>> dr = diff(F)

dr =

[ -3*sin(t), 3*cos(t), 3*sin(t)]

>> integral(dot(F, dr), 0, 2*pi)
Error using integral (line 82)
First input argument must be a function handle.

>> dot(F, dr)

ans =

9*sin(conj(t))*cos(t) - 9*cos(conj(t))*sin(t) - 3*sin(t)*(3*cos(conj(t)) - 5)

>> integral(ans, 0, 2*pi)
Error using integral (line 82)
First input argument must be a function handle.
```

Exercise two part one

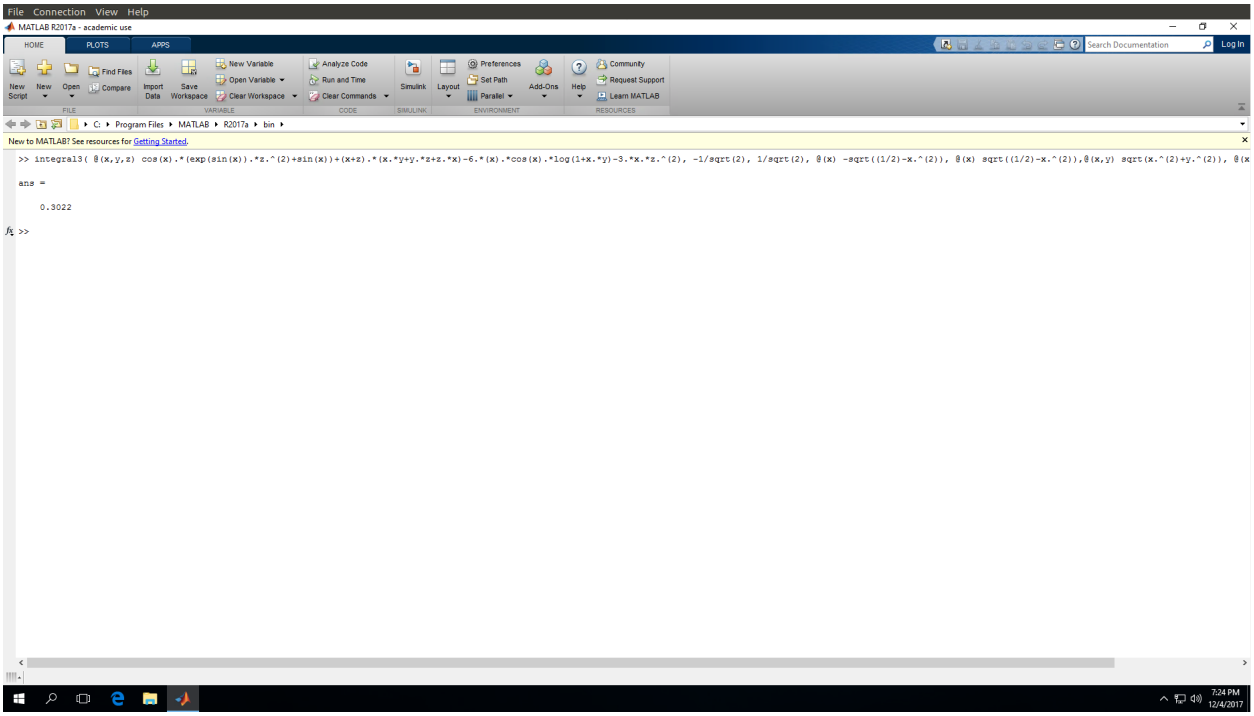


Exercise two part two

```
>> F = [x, y, z]

F =

[ x, y, z]

>> curl(F, [x, y, z])

ans =

 0
 0
 0

>> dot(ans, ds) % Dot product with curl of 0 will be zero
Undefined function or variable 'ds'.

>> % Therefore integral over surface S using the curl will also result in 0
>> % The first integral is easier by hand because we don;t need to compute the curl of F
>> % which would require taking the cross product.
>> %   However, the second one is easier numerically because the terms result in zero
>> % so it is easier for the computer to approximate it
```

Exercise two part three

Exercise Three



Exercise three