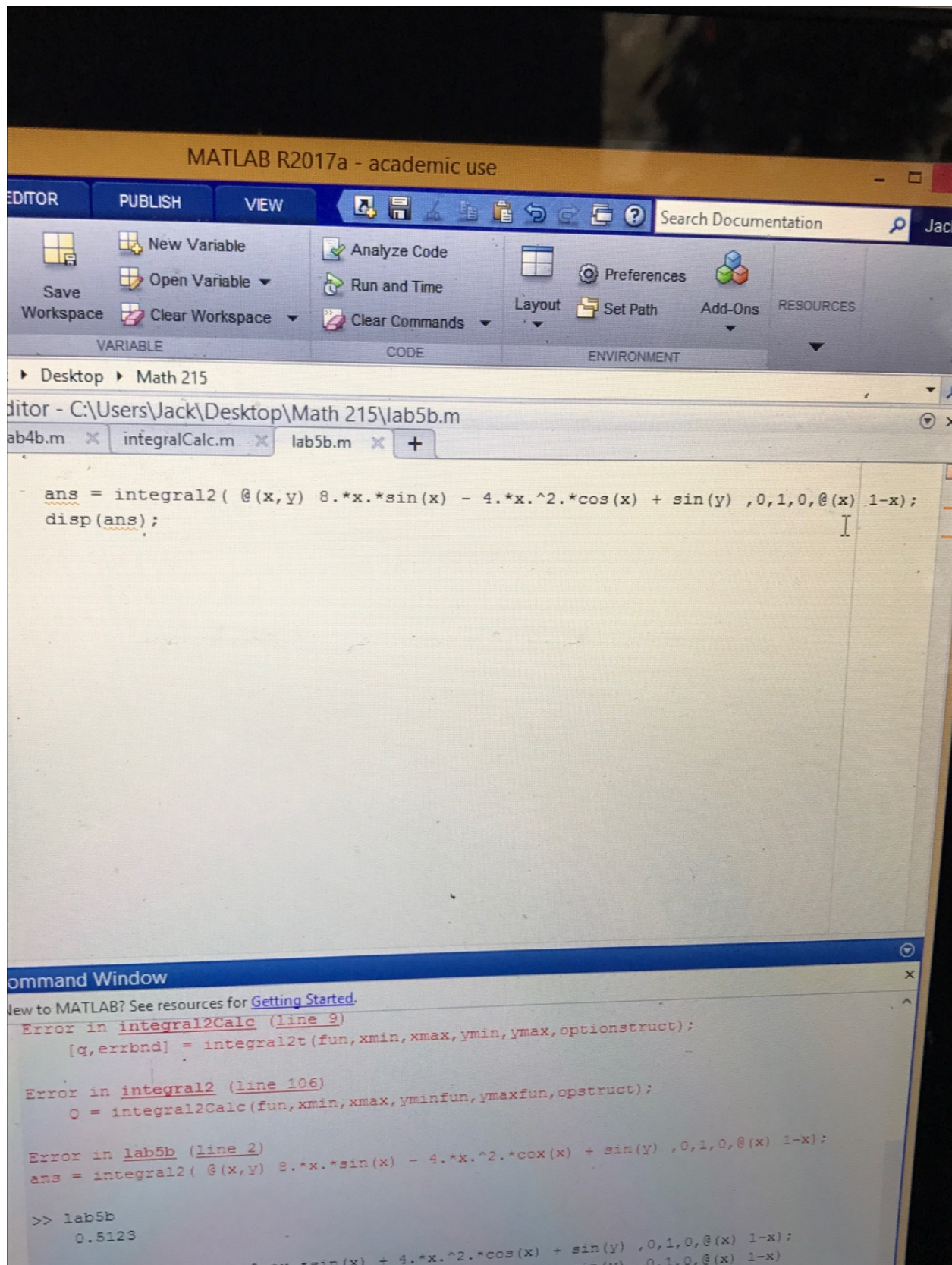


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Lab 5

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 origin
>> % 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

```
Command Window
New to MATLAB? See resources for Getting Started.
>> integral(@(t) 9.*sin(t).*cos(t) - 9.*cos(t).*sin(t) - 3.*sin(t).*(3*cos(t) - 5), 0, 2*pi)

ans =

    -1.4294e-15

>> % Therefore the line integral is zero
>> % Applying Stock's theorem
>> curl(F)
Error using sym/curl (line 43)
Argument contains less than three variables. Use vector of three variables as second argument.

>> F = [x, y, z]

F =

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

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

F =

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

>> x

x =

3*cos(t)

>> x = x

x =

3*cos(t)

>> delete x y z
Warning: File 'x' not found.
Warning: File 'y' not found.
Warning: File 'z' not found.
>> clear x y z
>> F = [x, y, z]
Undefined function or variable 'x'.

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

Exercise two part two

```

>> F = [x, y, z]

F =

[ x, y, z]

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

ans =

0
0
0

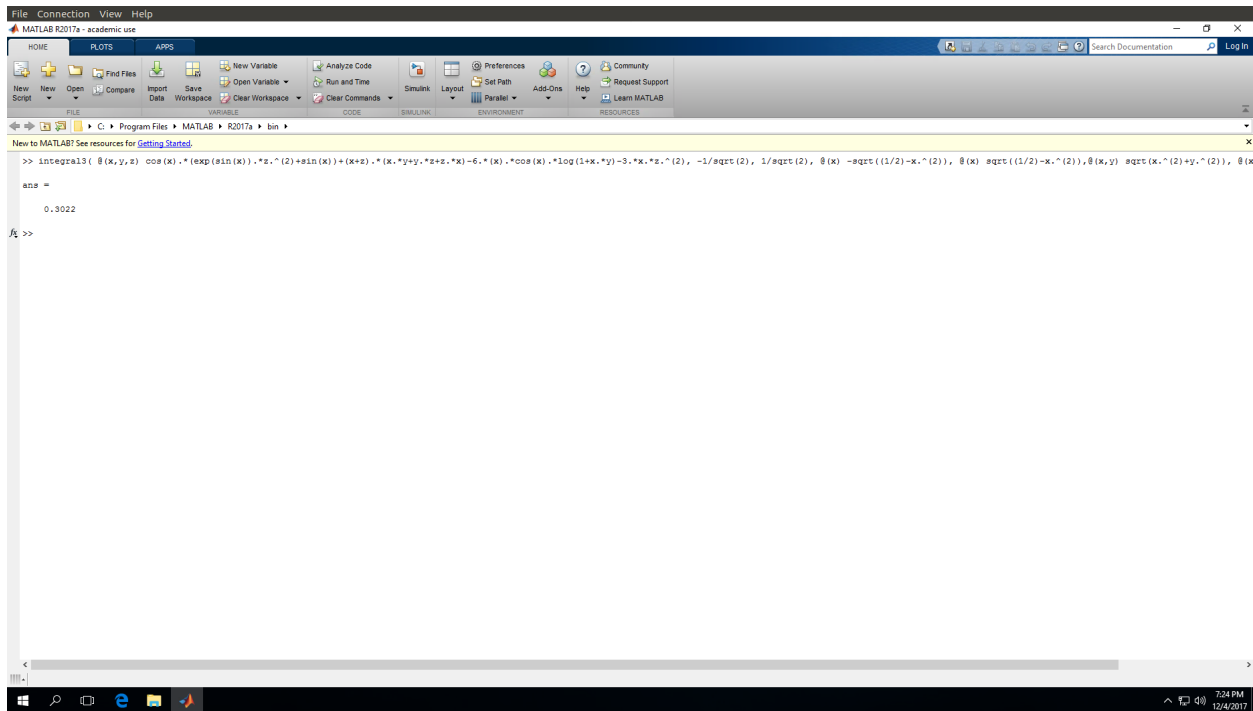
>> dot(ans, ds) % Dot product with curl of 0 will be zero
Undefined function or variable 'ds'.

>> % 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