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%Math 241-Matlab Project 3
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%Task 1:
syms x y z;
int(int(int(x,z,0,9-x^2-y^2),y,0,x),x,0,2)
```

ans =

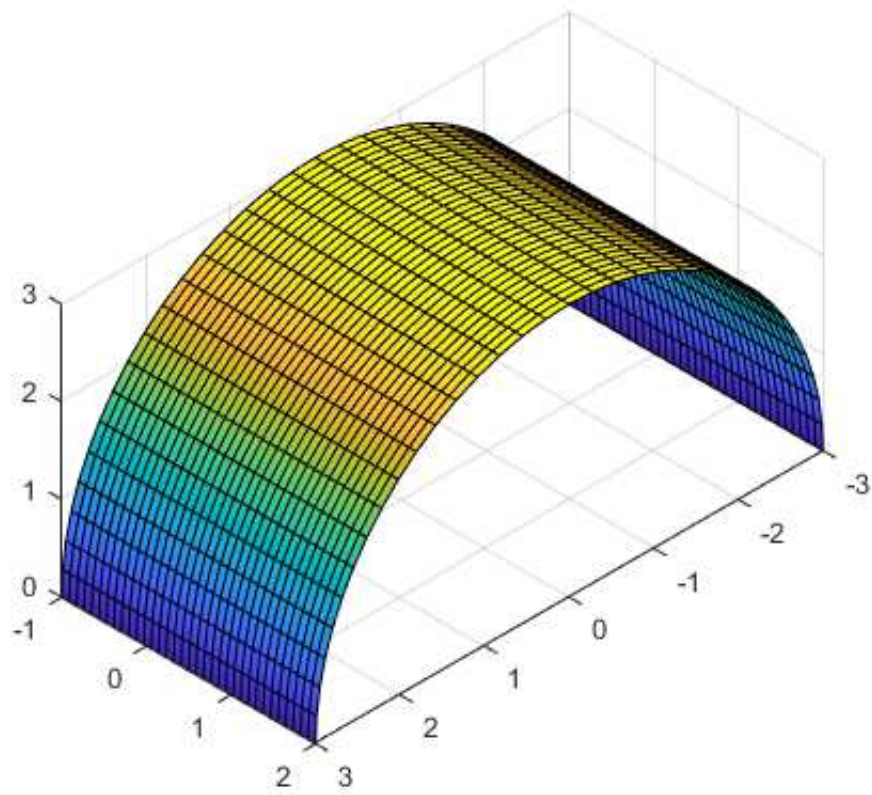
232/15

```
%Task 2:
syms theta r z
int(int(int(z*r,z,0,10-r*cos(theta)),r,0,sin(theta)),z,0,pi/2)
```

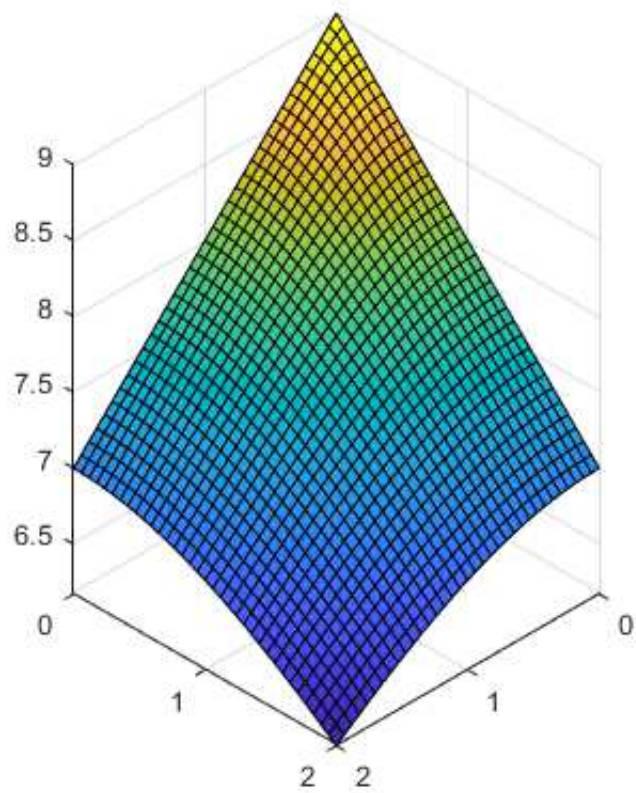
ans =

$$(\pi \sin(\theta)^2 (3 \cos(\theta)^2 \sin(\theta)^2 - 80 \cos(\theta) \sin(\theta) + 600)) / 48$$

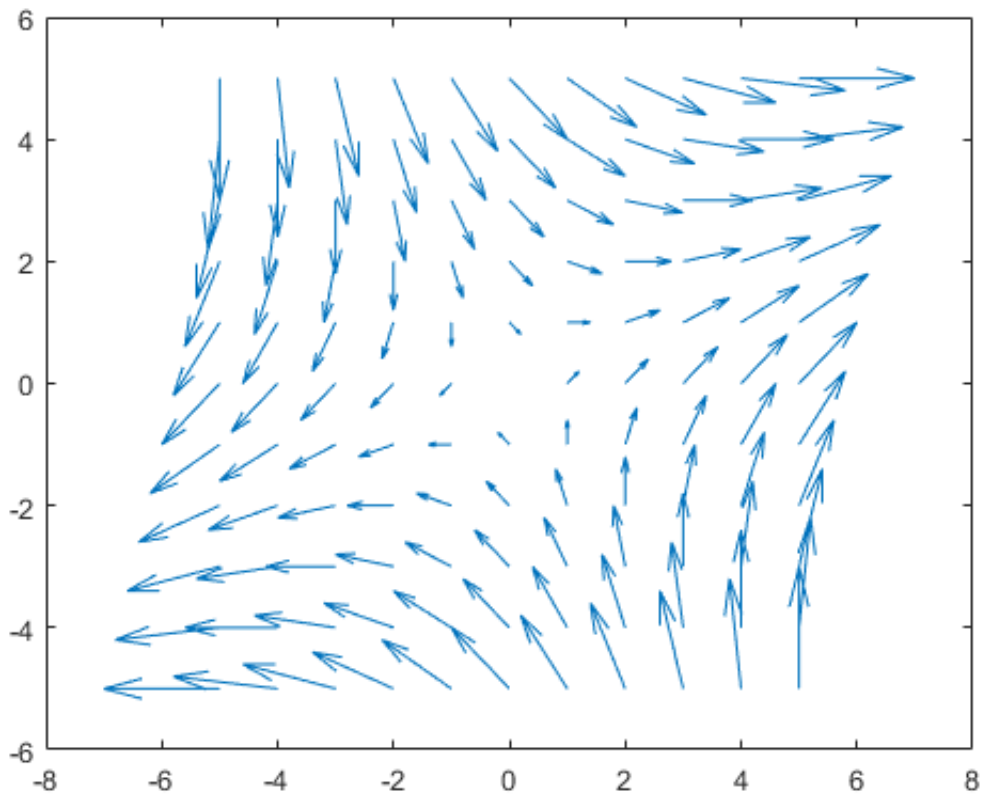
```
%Task 3:
clear all;
syms theta y;
rbar = [3*cos(theta),y,3*sin(theta)];
fsurf(rbar(1),rbar(2),rbar(3),[0,pi,-1,2])
view([10 10 10])
axis equal
```



```
%Task 4:  
clear all;  
syms x y;  
rbar = [x,y,9-sqrt(x^2+y^2)];  
fsurf(rbar(1),rbar(2),rbar(3),[0,2,0,2])  
view([10 10 10])  
axis equal
```



```
%Task 5:  
clear all;  
[x,y] = meshgrid(-5:1:5,-5:1:5);  
quiver(x,y,0.2*(x+y),0.2*(x-y),0);
```



```
%Task 6:
clear all;
syms theta x y;
rbar = [cos(theta),sin(theta)];
f = x^2+y^4;
mylength = @(u) sqrt(u*transpose(u));
mag = simplify(mylength(diff(rbar,theta)));
sub = subs(f,[x,y],rbar);
int(sub*mag,theta,0,2*pi)
```

ans =

$(7\pi)/4$

```
%Task 7:
clear all;
syms t x y z;
rbar = [3*t,t+1,t+1];
f = x+y;
mylength = @(u) sqrt(u*transpose(u));
mag = simplify(mylength(diff(rbar,t)));
sub = subs(f,[x,y,z],rbar);
int(sub*mag,t,0,1)
```

ans =

$3 \cdot 11^{1/2}$

```
%Task 8:
clear all;
syms theta x y z;
rbar = [x, 2*cos(theta), 2*sin(theta)];
F = [y*z, y*z, y];
sub = subs(F, [x, y, z], rbar);
int(dot(sub, diff(rbar, theta)), 0, 2*pi)
```

ans =

$4\pi$

```
%Task 9:
clear all;
syms x y z;
rbar = [x, y, 10-x-y];
f = x^2+y^2;
mylength = @(u) sqrt(u*transpose(u));
mag = simplify(mylength(cross(diff(rbar, x), diff(rbar, y))));
subresult = subs(f, [x, y, z], rbar);
int(int(subresult*mag, x, -1, 1), y, -1, 1)
```

ans =

$(8 \cdot 3^{1/2})/3$

```
%Task 10:
clear all;
syms x y z;
rbar = [x, y, x^2+y^2];
F = [y, -x, z];
kross = simplify(cross(diff(rbar, x), diff(rbar, y)));
sub = subs(F, [x, y, z], rbar);
int(int(dot(sub, kross), y, 0, 3), x, 0, 3)
```

ans =

