

### SKILL ACTIVITY 3

#### WRITE COMMANDS FOR FOLLOWING USING MATLAB

##### Q1. Evaluate following double integrals

- $$\int_1^2 \int_0^4 2xy \, dy \, dx$$

```
f = @(x,y) 2 .* x .* y
```

```
f = function_handle with value:  
@(x,y)2.*x.*y
```

```
integral2(f,1,2,0,4)
```

```
ans = 24
```

- $$\int_0^2 \int_{-1}^1 (x - y) \, dy \, dx$$

```
f = @(x,y) x - y
```

```
f = function_handle with value:  
@(x,y)x-y
```

```
integral2(f,0,2,-1,1)
```

```
ans = 4.0000
```

- $$\int_{-1}^0 \int_{-1}^1 (x + y + 1) \, dx \, dy$$

```
f = @(x,y) x + y + 1
```

```
f = function_handle with value:  
@(x,y)x+y+1
```

```
integral2(f,-1,1,-1,0)
```

```
ans = 1
```

- $$\int_0^1 \int_0^1 \left(1 - \frac{x^2 + y^2}{2}\right) \, dx \, dy$$

```
f = @(x,y) (1 - (x.^2 + y.^2) ./ 2)
```

```
f = function_handle with value:
```

@(x,y) (1-(x.^2+y.^2)./2)

integral2(f,0,1,0,1)

ans = 0.6667

- $$\int_0^3 \int_0^2 (4 - y^2) dy dx$$

f = @(x,y) 4 - y.^2

f = function\_handle with value:  
@(x,y)4-y.^2

integral2(f,0,3,0,2)

ans = 16.0000

- $$\int_0^3 \int_{-2}^0 (x^2 y - 2xy) dy dx$$

f = @(x,y) (x.^2.\*y - 2.\*x.\*y)

f = function\_handle with value:  
@(x,y)(x.^2.\*y-2.\*x.\*y)

integral2(f,0,3,0,-2)

ans = 6.3796e-14

- $$\int_0^1 \int_0^1 \left( \frac{y}{1+xy} \right) dx dy$$

f = @(x,y) (y ./ (1 + x .\* y))

f = function\_handle with value:  
@(x,y)(y./(1+x.\*y))

integral2(f,0,1,0,1)

ans = 0.3863

- $$\int_1^4 \int_0^4 \left( \frac{x}{2} + \sqrt{y} \right) dx dy$$

f = @(x,y) (x ./ 2 + sqrt(y))

f = function\_handle with value:

@(x,y) (x./2+sqrt(y))

```
integral2(f,0,4,1,4)
```

ans = 30.6667

- $$\int_0^{\ln 2} \int_1^{\ln 5} e^{2x+y} dy dx$$

```
f = @(x,y) exp(2 .* x + y)
```

f = function\_handle with value:  
@(x,y)exp(2.\*x+y)

```
integral2(f,0,log(2),1,log(5))
```

ans = 3.4226

- $$\int_0^1 \int_1^2 xye^x dy dx$$

```
f = @(x,y) x .* y .* exp(x)
```

f = function\_handle with value:  
@(x,y)x.\*y.\*exp(x)

```
integral2(f,0,1,1,2)
```

ans = 1.5000

- $$\int_{-1}^2 \int_0^{\pi/2} y \sin x dx dy$$

```
f = @(x,y) y.*sin(x)
```

f = function\_handle with value:  
@(x,y)y.\*sin(x)

```
integral2(f,0,pi/2,-1,2)
```

ans = 1.5000

- $$\int_{\pi}^{2\pi} \int_0^{\pi} (\sin x + \cos y) dx dy$$

```
f = @(x,y) sin(x) + cos(y)
```

f = function\_handle with value:

```
@(x,y) sin(x)+cos(y)
```

```
integral2(f,0,pi,pi,2*pi)
```

```
ans = 6.2832
```

- $$\int_1^4 \int_1^e \frac{\ln x}{xy} dx dy$$

```
f = @(x,y) log(x) ./ x .* y
```

```
f = function_handle with value:  
@(x,y) log(x) ./ x .* y
```

```
integral2(f,1,exp(1),1,4)
```

```
ans = 3.7500
```

- $$\int_{-1}^2 \int_1^2 x \ln y dy dx$$

```
f = @(x,y) x .* log(y)
```

```
f = function_handle with value:  
@(x,y) x .* log(y)
```

```
integral2(f,-1,2,1,2)
```

```
ans = 0.5794
```

- $$\int_0^1 \int_0^2 \frac{y-x}{(x+y)^3} dx dy$$

```
f = @(x,y) (y - x) ./ (x + y) .^ 3
```

```
f = function_handle with value:  
@(x,y) (y-x) ./ (x+y) .^ 3
```

```
integral2(f,0,2,0,1)
```

Warning: Reached the maximum number of function evaluations (10000). The result fails the global error test.

```
ans = -1.9815
```

- $$\int_0^2 \int_0^1 \frac{y-x}{(x+y)^3} dx dy$$

```
f = @(x,y) ( y - x ) ./ ( x + y ) .^ 3
```

```
f = function_handle with value:  
@(x,y)(y-x)./(x+y).^3
```

```
integral2(f,0,1,0,2)
```

Warning: Reached the maximum number of function evaluations (10000). The result fails the global error test.

```
ans = 1.9815
```

- $$\int_0^1 \int_{2y}^4 e^{x^2} dx dy$$

```
xmin = @(y) 2 * y
```

```
xmin = function_handle with value:  
@(y)2*y
```

```
f = @(x,y) exp(x.^2)
```

```
f = function_handle with value:  
@(x,y)exp(x.^2)
```

```
integral2(f,0,1,xmin,4)
```

```
ans = 4.1323
```

- $$\int_0^3 \int_{x^2}^9 x \cos(y)^2 dy dx$$

```
ymin = @(x) x * 2
```

```
ymin = function_handle with value:  
@(x)x*2
```

```
f = @(x,y) x .* cos(y) .^ 2
```

```
f = function_handle with value:  
@(x,y)x.*cos(y).^2
```

```
integral2(f,0,3,ymin,9)
```

```
ans = 10.5717
```

- $$\int_0^2 \int_{y^3}^{4\sqrt{2y}} (x^2 y - xy^2) dx dy$$

```
xmin = @(y) y .^3
```

```
xmin = function_handle with value:  
@(y)y.^3
```

```
xmax = @(y) 4 .* sqrt(2 .*y)
```

```
xmax = function_handle with value:  
@(y)4.*sqrt(2.*y)
```

```
f = @(x,y) x.^2 .* y - x .* y.^2
```

```
f = function_handle with value:  
@(x,y)x.^2.*y-x.*y.^2
```

```
integral2(f,0,2,xmin,xmax)
```

```
ans = -97.4315
```

- $$\int_0^2 \int_0^{4-y^2} e^{xy} dx dy$$

```
xmax = @(y) 4 - y.^2
```

```
xmax = function_handle with value:  
@(y)4-y.^2
```

```
f = @(x,y) exp(x .* y)
```

```
f = function_handle with value:  
@(x,y)exp(x.*y)
```

```
integral2(f,0,2,0,xmax)
```

```
ans = 20.5648
```

- $$\int_1^2 \int_0^{x^2} \frac{1}{x+y} dy dx$$

```
ymin = @(x) x.^2
```

```
ymin = function_handle with value:  
@(x)x.^2
```

```
f = @(x,y) 1 ./ (x + y)
```

```
f = function_handle with value:  
@(x,y)1./(x+y)
```

```
integral2(f,0,1,0,ymin)
```

```
ans = 0.3863
```

- $\int_1^2 \int_{y^3}^8 \frac{1}{\sqrt{x^2 + y^2}} dx dy$

```
xmin = @(y) y .^ 3
```

```
xmin = function_handle with value:  
@(y)y.^3
```

```
f = @(x,y) 1 ./ (sqrt(x .^ 2 + y .^ 2))
```

```
f = function_handle with value:  
@(x,y)1./(sqrt(x.^2+y.^2))
```

```
integral2(f,1,2,xmin,8)
```

```
ans = 0.8666
```

- $\iint_R (6y^2 - 2x) dA, R : 0 \leq x \leq 1, 0 \leq y \leq 2$

```
f = @(x,y) 6 .* y .^ 2 - 2 .* x
```

```
f = function_handle with value:  
@(x,y)6.*y.^2-2.*x
```

```
integral2(f,0,1,0,2)
```

```
ans = 14.0000
```

- $\iint_R \left( \frac{\sqrt{x}}{y^2} \right) dA, R : 0 \leq x \leq 4, 1 \leq y \leq 2$

```
f = @(x,y) sqrt(x) ./ (y .^ 2)
```

```
f = function_handle with value:  
@(x,y)sqrt(x)./(y.^2)
```

```
integral2(f,0,4,1,2)
```

```
ans = 2.6667
```

- $\iint_R xy \cos y dA, R : -1 \leq x \leq 1, 0 \leq y \leq \pi$

```
f = @(x,y) x .* y.*cos(y)
```

```
f = function_handle with value:  
@(x,y)x.*y.*cos(y)
```

```
integral2(f,-1,1,0,pi)
```

```
ans = 1.4225e-16
```

- $\iint_R y \sin(x+y) dA, R : -\pi \leq x \leq 0, 0 \leq y \leq \pi$

```
f = @(x,y) y .* sin(x + y)
```

```
f = function_handle with value:  
@(x,y)y.*sin(x+y)
```

```
integral2(f,-pi,0,0,pi)
```

```
ans = 4.0000
```

- $\iint_R e^{x-y} dA, R : 0 \leq x \leq \ln 2, 0 \leq y \leq \ln 2$

```
f = @(x,y) exp(x-y)
```

```
f = function_handle with value:  
@(x,y)exp(x-y)
```

```
integral2(f,0,log(2),0,log(5))
```

```
ans = 0.8000
```

- $\iint_R xye^{xy^2} dA, R : 0 \leq x \leq 2, 0 \leq y \leq 1$

```
f = @(x,y) x .* y .* exp( x .* y .^ 2)
```

```
f = function_handle with value:  
@(x,y)x.*y.*exp(x.*y.^2)
```

```
integral2(f,0,2,0,1)
```

```
ans = 2.1945
```

- $\iint_R \frac{xy^3}{x^2+1} dA, R : 0 \leq x \leq 1, 0 \leq y \leq 2$

```
f = @(x,y) (x .* y .^ 3) ./ (x .^ 2 + 1)
```

```
f = function_handle with value:  
@(x,y)(x.*y.^3)./(x.^2+1)
```

```
integral2(f,0,1,0,2)
```

ans = 1.3863

•  $\iint_R \frac{y}{x^2 y^2 + 1} dA, R : 0 \leq x \leq 1, 0 \leq y \leq 1$

```
f = @(x,y) y ./ ( x.^2 .* y.^2 + 1)
```

```
f = function_handle with value:  
@(x,y)y./(x.^2.*y.^2+1)
```

```
integral2(f,0,1,0,1)
```

ans = 0.4388