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PHYS 365 9/26/16

Assignment 5\_1

**4)**

**Function:**

function [vol, sa] = calc\_vol\_and\_sa(radius,height)

% Takes the radius and height of any cylinder and calculates the volume and

% surface area of the cylinder specified.

vol = pi\*radius^2\*height;

sa = 2\*pi\*radius\*height;

end

**Command:**

>> [volume, surface\_area] = calc\_vol\_and\_sa(1,5)

volume =

15.7080

surface\_area =

31.4159

**9)**

**Function:**

function random\_row(matrix)

% Takes a matrix, and prints a random row of the matrix to the command

% line.

a = size(matrix,2);

n = randi([1 a],1,1);

disp(matrix(n,:))

end

**Command:**

>> mat = [1,2,3;4,5,6;7,8,9]

mat =

1 2 3

4 5 6

7 8 9

>> random\_row(mat)

7 8 9

**13)**

**Script:**

% Script used for calling three functions. The first prompts the user for

% an angle measured in degrees. The second will convert the angle to

% radians. The third will then print the result.

inp\_ang = ask\_for\_angle();

ang\_rad = convert\_angle(inp\_ang);

print\_angle(ang\_rad);

**Function 1:**

function [angle] = ask\_for\_angle()

% Prompts the user for an angle. Function for angle\_conversion.m.

angle = input('Enter an angle in degrees:\n');

end

**Function 2:**

function [angle\_in\_rad] = convert\_angle(angle\_in\_deg)

% Takes angle in degrees and convets it to radians. Function for

% angle\_conversion.m.

angle\_in\_rad = angle\_in\_deg\*(pi/180);

end

**Function 3:**

function print\_angle(angle\_in\_rad)

% Takes an angle in radians an prints it to the command line. Function for

% angle\_conversion.m.

fprintf('Here is your angle in radians: %f\n',angle\_in\_rad)

end

**Command:**

>> angle\_conversion

Enter an angle in degrees:

0

Here is your angle in radians: 0.000000

>> angle\_conversion

Enter an angle in degrees:

90

Here is your angle in radians: 1.570796

**14)**

**Script:**

% Script used for calling two functions. The first prompts the user for

% an angle measured in degrees. The second will convert the angle to

% radians, and print the result.

inp\_ang = ask\_for\_angle();

print\_angle(inp\_ang);

**Function 1:**

function [angle] = ask\_for\_angle()

% Prompts the user for an angle. Function for angle\_conversion.m.

angle = input('Enter an angle in degrees:\n');

end

**Function 2:**

function print\_angle(ang\_in\_deg)

% Takes an angle in radians an prints it to the command line. Function for

% angle\_conversion.m.

fprintf('Here is your angle in radians: %f\n',convert\_angle(ang\_in\_deg))

end

function [angle\_in\_rad] = convert\_angle(angle\_in\_deg)

% Takes angle in degrees and convets it to radians. Function for

% angle\_conversion.m.

angle\_in\_rad = angle\_in\_deg\*(pi/180);

end

**Command:**

>> angle\_conversion

Enter an angle in degrees:

180

Here is your angle in radians: 3.141593

>> angle\_conversion

Enter an angle in degrees:

270

Here is your angle in radians: 4.712389

**19)**

**Script:**

% Script used to calculate the area of a triangle. Prompts the user for

% three coordinates in two dimensional space which correspond to the

% vertices of the triangle. Coordinates must be entered as a MATLAB

% vector. Calls a function calc\_area, which calls on a sub-function

% get\_dist to find the lengths of the sides of the triangle.

a = input('Please enter the coordinates of the first vertex of a triangle:');

b = input('Please enter the coordinates of the second vertex of a triangle:');

c = input('Please enter the coordinates of the third vertex of a triangle:');

area = calc\_area(a,b,c);

fprintf('Here is the area of your triangle: %f\n',area);

**Function:**

function [area] = calc\_area(a,b,c)

% Takes coordinates of the vertices of a triangle, calls on get\_dist to

% find the lengths of the sides, and then calculates the area of a

% triangle.

A = get\_dist(a,b);

B = get\_dist(b,c);

C = get\_dist(a,c);

s = (1/2)\*(A+B+C);

area = (s\*(s-A)\*(s-B)\*(s-C))^(1/2);

end

function [dist] = get\_dist(n,m)

% Takes two points in two dimensional space and calculates the distance

% between them.

dist = ((m(1)-n(1))^2+(m(2)-n(2))^2)^(1/2);

end

**Command:**

>> area\_of\_triangle

Please enter the coordinates of the first vertex of a triangle:[0,0]

Please enter the coordinates of the second vertex of a triangle:[5,0]

Please enter the coordinates of the third vertex of a triangle:[0,5]

Here is the area of your triangle: 12.500000