
Chapter 4 HW

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Problem 1

a. 1. Define range for radius r 2. Create arrays for storing volumes and surface areas 3. Calculate volumes and surface areas using values in range of radius 4. Plot volumes vs. surface areas

b.

```
radii = 0:0.1:3
volumes = zeros(size(radii))
surface_areas = zeros(size(radii))

for i = 1:length(radii)
    r = radii(i)

    V = (4/3) * pi * r^3
    volumes(i) = V

    A = 4 * pi * r^2
    surface_areas(i) = A
end

figure
plot(surface_areas, volumes, 'o-')
xlabel('Surface Area (square meters)')
ylabel('Volume (cubic meters)')
title('Volume vs Surface Area of a Sphere')
grid on

radii =
```

Columns 1 through 7

0 0.1000 0.2000 0.3000 0.4000 0.5000 0.6000

Columns 8 through 14

0.7000 0.8000 0.9000 1.0000 1.1000 1.2000 1.3000

Columns 15 through 21

1.4000 1.5000 1.6000 1.7000 1.8000 1.9000 2.0000

Columns 22 through 28

2.1000 2.2000 2.3000 2.4000 2.5000 2.6000 2.7000

Columns 29 through 31

2.8000 2.9000 3.0000

volumes =

Columns 1 through 13

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 14 through 26

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 27 through 31

0 0 0 0 0

surface_areas =

Columns 1 through 13

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 14 through 26

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 27 through 31

0 0 0 0 0

r =

0

V =

0

volumes =

Columns 1 through 13

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 14 through 26

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 27 through 31

0 0 0 0 0

A =

0

surface_areas =

Columns 1 through 13

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 14 through 26

0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 27 through 31

0 0 0 0 0

r =

0.1000

V =

0.0042

volumes =

Columns 1 through 7

0	0.0042	0	0	0	0	0
---	--------	---	---	---	---	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

0.1257

surface_areas =

Columns 1 through 7

0	0.1257	0	0	0	0	0
---	--------	---	---	---	---	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

0.2000

V =

0.0335

volumes =

Columns 1 through 7

0	0.0042	0.0335	0	0	0	0
---	--------	--------	---	---	---	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

0.5027

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	0	0	0	0
---	--------	--------	---	---	---	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$r =$

0.3000

$V =$

0.1131

$volumes =$

Columns 1 through 7

0	0.0042	0.0335	0.1131	0	0	0
---	--------	--------	--------	---	---	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$A =$

1.1310

$surface_areas =$

Columns 1 through 7

0	0.1257	0.5027	1.1310	0	0	0
---	--------	--------	--------	---	---	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$r =$

0.4000

$V =$

0.2681

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0 0

Columns 8 through 14

0 0 0 0 0 0 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$A =$

2.0106

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 0 0

Columns 8 through 14

0 0 0 0 0 0 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$r =$

0.5000

$V =$

0.5236

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0

Columns 8 through 14

0 0 0 0 0 0 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$A =$

3.1416

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	0
---	--------	--------	--------	--------	--------	---

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

0.6000

V =

0.9048

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

4.5239

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

0.7000

V =

1.4368

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	0	0	0	0	0	0
--------	---	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

A =

6.1575

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 0 0 0 0 0 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

r =

0.8000

V =

2.1447

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368	2.1447	0	0	0	0	0
--------	--------	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

8.0425

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	0	0	0	0	0
--------	--------	---	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

0.9000

V =

3.0536

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	0	0	0	0
--------	--------	--------	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

10.1788

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	0	0	0	0
--------	--------	---------	---	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

1

V =

4.1888

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	0	0	0
--------	--------	--------	--------	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

12.5664

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	0	0	0
--------	--------	---------	---------	---	---	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0 0 0

$r =$

1.1000

$V =$

5.5753

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 0 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$A =$

15.2053

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 8.0425 10.1788 12.5664 15.2053 0 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$r =$

1.2000

$V =$

7.2382

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 7.2382 0

Columns 15 through 21

0 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$A =$

18.0956

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	0
--------	--------	---------	---------	---------	---------	---

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$r =$

1.3000

$V =$

9.2028

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$A =$

21.2372

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

1.4000

V =

11.4940

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	0	0	0	0	0	0
---------	---	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0 0 0

A =

24.6301

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 8.0425 10.1788 12.5664 15.2053 18.0956 21.2372

Columns 15 through 21

24.6301 0 0 0 0 0 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

r =

1.5000

V =

14.1372

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 7.2382 9.2028

Columns 15 through 21

11.4940	14.1372	0	0	0	0	0
---------	---------	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

28.2743

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	0	0	0	0	0
---------	---------	---	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

1.6000

V =

17.1573

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	0	0	0	0
---------	---------	---------	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

32.1699

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	0	0	0	0
---------	---------	---------	---	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

1.7000

V =

20.5795

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	0	0	0
---------	---------	---------	---------	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

36.3168

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	0	0	0
---------	---------	---------	---------	---	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

1.8000

V =

24.4290

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	0	0
---------	---------	---------	---------	---------	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

40.7150

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	0	0
---------	---------	---------	---------	---------	---	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0 0 0

$r =$

1.9000

$V =$

28.7309

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 7.2382 9.2028

Columns 15 through 21

11.4940 14.1372 17.1573 20.5795 24.4290 28.7309 0

Columns 22 through 28

0 0 0 0 0 0 0

Columns 29 through 31

0 0 0

$A =$

45.3646

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 8.0425 10.1788 12.5664 15.2053 18.0956 21.2372

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	0
---------	---------	---------	---------	---------	---------	---

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$r =$

2

$V =$

33.5103

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$A =$

50.2655

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

0	0	0	0	0	0	0
---	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$r =$

2.1000

$V =$

38.7924

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	0	0	0	0	0	0
---------	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

$A =$

55.4177

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177	0	0	0	0	0	0
---------	---	---	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

2.2000

V =

44.6022

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	44.6022	0	0	0	0	0
---------	---------	---	---	---	---	---

Columns 29 through 31

0 0 0

A =

60.8212

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 8.0425 10.1788 12.5664 15.2053 18.0956 21.2372

Columns 15 through 21

24.6301 28.2743 32.1699 36.3168 40.7150 45.3646 50.2655

Columns 22 through 28

55.4177 60.8212 0 0 0 0 0

Columns 29 through 31

0 0 0

r =

2.3000

V =

50.9650

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 7.2382 9.2028

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	44.6022	50.9650	0	0	0	0
---------	---------	---------	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

66.4761

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177	60.8212	66.4761	0	0	0	0
---------	---------	---------	---	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

2.4000

V =

57.9058

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	44.6022	50.9650	57.9058	0	0	0
---------	---------	---------	---------	---	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

72.3823

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177	60.8212	66.4761	72.3823	0	0	0
---------	---------	---------	---------	---	---	---

Columns 29 through 31

0	0	0
---	---	---

r =

2.5000

V =

65.4498

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	44.6022	50.9650	57.9058	65.4498	0	0
---------	---------	---------	---------	---------	---	---

Columns 29 through 31

0	0	0
---	---	---

A =

78.5398

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177	60.8212	66.4761	72.3823	78.5398	0	0
---------	---------	---------	---------	---------	---	---

Columns 29 through 31

0	0	0
---	---	---

$r =$

2.6000

$V =$

73.6222

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	44.6022	50.9650	57.9058	65.4498	73.6222	0
---------	---------	---------	---------	---------	---------	---

Columns 29 through 31

0	0	0
---	---	---

$A =$

84.9487

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177 60.8212 66.4761 72.3823 78.5398 84.9487 0

Columns 29 through 31

0 0 0

$r =$

2.7000

$V =$

82.4480

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 7.2382 9.2028

Columns 15 through 21

11.4940 14.1372 17.1573 20.5795 24.4290 28.7309 33.5103

Columns 22 through 28

38.7924 44.6022 50.9650 57.9058 65.4498 73.6222 82.4480

Columns 29 through 31

0 0 0

$A =$

91.6088

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 8.0425 10.1788 12.5664 15.2053 18.0956 21.2372

Columns 15 through 21

24.6301 28.2743 32.1699 36.3168 40.7150 45.3646 50.2655

Columns 22 through 28

55.4177 60.8212 66.4761 72.3823 78.5398 84.9487 91.6088

Columns 29 through 31

0 0 0

$r =$

2.8000

$V =$

91.9523

volumes =

Columns 1 through 7

0 0.0042 0.0335 0.1131 0.2681 0.5236 0.9048

Columns 8 through 14

1.4368 2.1447 3.0536 4.1888 5.5753 7.2382 9.2028

Columns 15 through 21

11.4940 14.1372 17.1573 20.5795 24.4290 28.7309 33.5103

Columns 22 through 28

38.7924 44.6022 50.9650 57.9058 65.4498 73.6222 82.4480

Columns 29 through 31

91.9523 0 0

$A =$

98.5203

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177	60.8212	66.4761	72.3823	78.5398	84.9487	91.6088
---------	---------	---------	---------	---------	---------	---------

Columns 29 through 31

98.5203	0	0
---------	---	---

$r =$

2.9000

$V =$

102.1604

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924	44.6022	50.9650	57.9058	65.4498	73.6222	82.4480
---------	---------	---------	---------	---------	---------	---------

Columns 29 through 31

91.9523	102.1604	0
---------	----------	---

A =

105.6832

surface_areas =

Columns 1 through 7

0	0.1257	0.5027	1.1310	2.0106	3.1416	4.5239
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

6.1575	8.0425	10.1788	12.5664	15.2053	18.0956	21.2372
--------	--------	---------	---------	---------	---------	---------

Columns 15 through 21

24.6301	28.2743	32.1699	36.3168	40.7150	45.3646	50.2655
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

55.4177	60.8212	66.4761	72.3823	78.5398	84.9487	91.6088
---------	---------	---------	---------	---------	---------	---------

Columns 29 through 31

98.5203	105.6832	0
---------	----------	---

r =

3

V =

113.0973

volumes =

Columns 1 through 7

0	0.0042	0.0335	0.1131	0.2681	0.5236	0.9048
---	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.4368	2.1447	3.0536	4.1888	5.5753	7.2382	9.2028
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 21

11.4940	14.1372	17.1573	20.5795	24.4290	28.7309	33.5103
---------	---------	---------	---------	---------	---------	---------

Columns 22 through 28

38.7924 44.6022 50.9650 57.9058 65.4498 73.6222 82.4480

Columns 29 through 31

91.9523 102.1604 113.0973

A =

113.0973

surface_areas =

Columns 1 through 7

0 0.1257 0.5027 1.1310 2.0106 3.1416 4.5239

Columns 8 through 14

6.1575 8.0425 10.1788 12.5664 15.2053 18.0956 21.2372

Columns 15 through 21

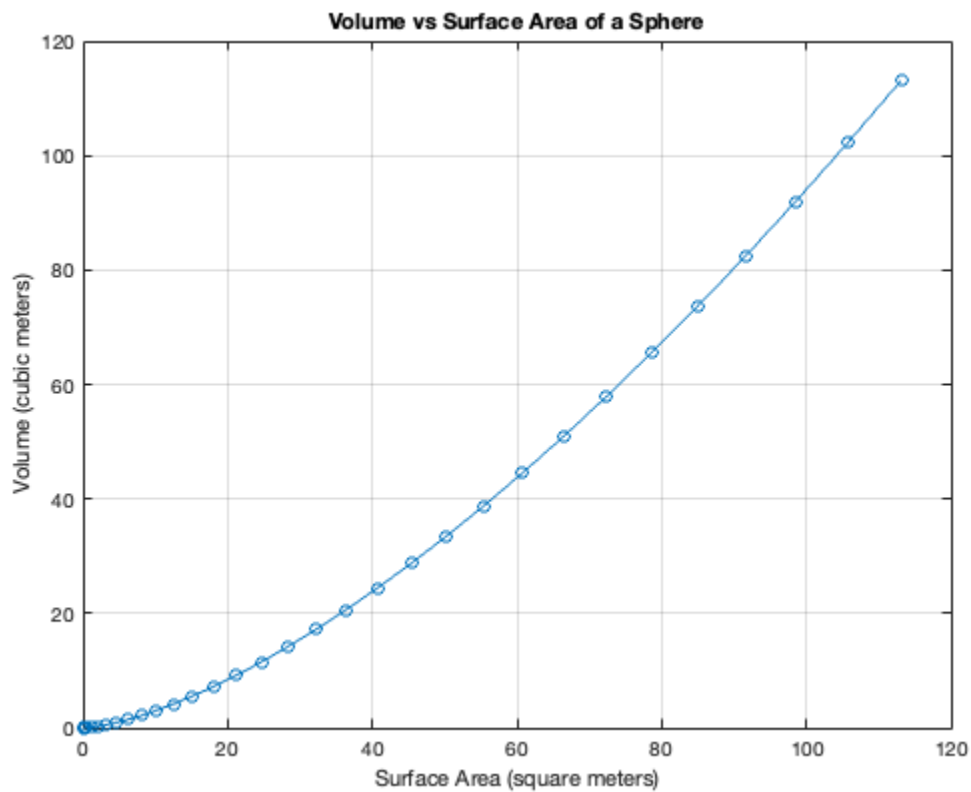
24.6301 28.2743 32.1699 36.3168 40.7150 45.3646 50.2655

Columns 22 through 28

55.4177 60.8212 66.4761 72.3823 78.5398 84.9487 91.6088

Columns 29 through 31

98.5203 105.6832 113.0973



Problem 7

```
x = [-3, 0, 0, 2, 6, 8]
y = [-5, -2, 0, 3, 4, 10]
```

```
for i = 1:numel(x)
    if x(i) > y(i)
        fprintf("%d ", x(i))
    end
end
fprintf("\n")
```

```
x =
```

```
    -3     0     0     2     6     8
```

```
y =
```

```
    -5    -2     0     3     4    10
```

```
-3 0 6
```

Problem 11

```
x = [-3, 0, 0, 2, 5, 8]
y = [-5, -2, 0, 3, 4, 10]
% a.
z = y <~ x
% b.
z = x & y
% c.
z = x | y
% d.
z = xor(x,y)
```

```
x =

    -3     0     0     2     5     8
```

```
y =

    -5    -2     0     3     4    10
```

```
z =

1x6 logical array

     1     1     1     0     0     0
```

```
z =

1x6 logical array

     1     0     0     1     1     1
```

```
z =

1x6 logical array

     1     1     0     1     1     1
```

```
z =

1x6 logical array

     0     1     0     0     0     0
```

Problem 17

```
if x < y && z < 10 w = x * y * z end
```

Problem 23

```
sum = 0
for k = 1:10
    term = 5 * k^3
    sum = sum + term
end
```

```
sum =
```

```
0
```

```
term =
```

```
5
```

```
sum =
```

```
5
```

```
term =
```

```
40
```

```
sum =
```

```
45
```

```
term =
```

```
135
```

```
sum =
```

```
180
```

```
term =
```

```
320
```


sum =

500

term =

625

sum =

1125

term =

1080

sum =

2205

term =

1715

sum =

3920

term =

2560

sum =

6480

term =

3645

sum =

10125

```
term =  
  
    5000
```

```
sum =  
  
    15125
```

Problem 38

```
initial_deposit = 2000  
target = 100000  
  
bank1_interest_rate = 4.5 / 100  
bank2_interest_rate = 3.5 / 100  
  
bank1_balance = initial_deposit  
bank2_balance = initial_deposit  
years = 0  
  
while bank2_balance < target  
    bank1_balance = bank1_balance * (1 + bank1_interest_rate)  
    bank2_balance = bank2_balance * (1 + bank2_interest_rate) +  
    initial_deposit  
    years = years + 1  
end  
  
initial_deposit =  
  
    2000  
  
target =  
  
    100000  
  
bank1_interest_rate =  
  
    0.0450  
  
bank2_interest_rate =  
  
    0.0350  
  
bank1_balance =
```

2000

bank2_balance =

2000

years =

0

bank1_balance =

2090

bank2_balance =

4070

years =

1

bank1_balance =

2.1840e+03

bank2_balance =

6.2124e+03

years =

2

bank1_balance =

2.2823e+03

bank2_balance =

8.4299e+03

years =

3

bank1_balance =

2.3850e+03

bank2_balance =

1.0725e+04

years =

4

bank1_balance =

2.4924e+03

bank2_balance =

1.3100e+04

years =

5

bank1_balance =

2.6045e+03

bank2_balance =

1.5559e+04

years =

6

bank1_balance =

2.7217e+03

bank2_balance =

1.8103e+04

years =

7

bank1_balance =

2.8442e+03

bank2_balance =

2.0737e+04

years =

8

bank1_balance =

2.9722e+03

bank2_balance =

2.3463e+04

years =

9

bank1_balance =

3.1059e+03

bank2_balance =

2.6284e+04

years =

10

bank1_balance =

3.2457e+03

bank2_balance =

2.9204e+04

years =

11

bank1_balance =

3.3918e+03

bank2_balance =

3.2226e+04

years =

12

bank1_balance =

3.5444e+03

bank2_balance =

3.5354e+04

years =

13

bank1_balance =

3.7039e+03

bank2_balance =

3.8591e+04

years =

14

bank1_balance =

3.8706e+03

bank2_balance =

4.1942e+04

years =

15

bank1_balance =

4.0447e+03

bank2_balance =

4.5410e+04

years =

16

bank1_balance =

4.2268e+03

bank2_balance =

4.8999e+04

years =

17

bank1_balance =

4.4170e+03

bank2_balance =

5.2714e+04

years =

18

bank1_balance =

4.6157e+03

bank2_balance =

5.6559e+04

years =

19

bank1_balance =

4.8234e+03

bank2_balance =

6.0539e+04

years =

20

bank1_balance =

5.0405e+03

bank2_balance =

6.4658e+04

years =

21

bank1_balance =

5.2673e+03

bank2_balance =

6.8921e+04

years =

22

bank1_balance =

5.5043e+03

bank2_balance =

7.3333e+04

years =

23

bank1_balance =

5.7520e+03

bank2_balance =

7.7900e+04

years =

24

bank1_balance =

6.0109e+03

bank2_balance =

8.2626e+04

years =

25

bank1_balance =

6.2814e+03

bank2_balance =

8.7518e+04

years =

26

bank1_balance =

6.5640e+03

bank2_balance =

9.2581e+04

years =

27

bank1_balance =

6.8594e+03

bank2_balance =

9.7822e+04

years =

28

```
bank1_balance =
```

```
7.1681e+03
```

```
bank2_balance =
```

```
1.0325e+05
```

```
years =
```

```
29
```

Problem 46

```
W = input('Enter the weight (W): ')
material_type = input('Enter the type of material: ', 's')
switch material_type
    case 'Metal on metal'
        mu = 0.20
    case 'Wood on wood'
        mu = 0.35
    case 'Metal on wood'
        mu = 0.40
    case 'Rubber on concrete'
        mu = 0.70
    otherwise
        error('Invalid material type.')
end

F = mu * W
```

```
Error using input
Cannot call INPUT from EVALC.
```

```
Error in LucasGobacoChapter4HW (line 85)
W = input('Enter the weight (W): ')
```

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