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```
clear;clc;
```

Problem 1:

```
clear;clc;
f = @(x) (x+1./x).^2;
for n = 1:4
    t = linspace(1,2,n+1);
    a = f(t);
    result(n) = trapz(t,a);
end
error = abs(result-29/6)./(29/6);
disp("result:");
disp(result);
disp("error:");
disp(error);
```

```
result:
    5.1250    4.9097    4.8677    4.8527

error:
    0.0603    0.0158    0.0071    0.0040
```

Problem 2:

```
clear;clc;
f = @(x) (4*x-3).^3;
for n = 4:5
    t = linspace(-3,5,n+1);
    result(n-3)=0;
    for i = 1:n
        result(n-3) = quad(f,t(i),t(i+1))+result(n-3);
    end
end
error = abs(result-(17^4-15^4)/16)./((17^4-15^4)/16);
disp("result:");
disp(result);
```

```
disp("error:");
disp(error);
```

```
result:
   1.0e+03 *

    2.0560    2.0560

error:
   1.0e-15 *

         0    0.6635
```

Problem 3:

```
clear;clc;
f = @(x) (x.^2.*exp(x));
t = linspace(0,3,5);
a = f(t);
result = trapz(t,a);
error = abs(result-(5*exp(3)-2))./(5*exp(3)-2);
disp("result:");
disp(result);
disp("error:");
disp(error);

result=0;
for i = 1:4
    result = quad(f,t(i),t(i+1))+result;
end
error = abs(result-(5*exp(3)-2))./(5*exp(3)-2);
disp("result:");
disp(result);
disp("error:");
disp(error);
```

```
result:
  112.2684

error:
    0.1406

result:
   98.4277

error:
   5.9947e-11
```

Problem 4:

```
clear;clc;
```

```
y = [0 1 3 5 7 8 9 10];
H = [0 1 1.5 3 3.5 3.2 2 0];
U = [0 0.1 0.12 0.2 0.25 0.3 0.15 0];
averagedepth = trapz(y,H)/10;
area = trapz(y,H);
averagevelocity = trapz(y,H.*U)/area;
flowrate = trapz(y,H.*U);
disp("averagedepth: (m)");
disp(averagedepth);
disp("area:(m^2)");
disp(area);
disp("averagevelocity: (m/s)");
disp(averagevelocity);
disp("flowrate: (m^3/s)");
disp(flowrate);
```

```
averagedepth: (m)
    2.0950

area:(m^2)
   20.9500

averagevelocity: (m/s)
    0.2044

flowrate: (m^3/s)
    4.2825
```

Problem 5:

```
clear;clc;
t = [0 1 5.5 10 12 14 16 18 20 24];
c = [1 1.5 2.3 2.1 4 5 5.5 5 3 1.2];
Q = @(t) 20 + 10. * sin(pi./12.*(t-10));
A = trapz(t,Q(t).*c);
B = quad(Q,0,24);
c_average = A/B;
disp("c_average: (mg/L)");
disp(c_average);
```

```
c_average: (mg/L)
    3.4852
```

Problem 6:

```
clear;clc;
T = [0 15 30 45 60 75];
R = [18 24 26 20 18 9];
total = trapz(T,R/4);
rate = total/75;
disp("total");
```

```
disp(total);
disp("rate");
disp(rate);
```

```
total
  380.6250

rate
    5.0750
```

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