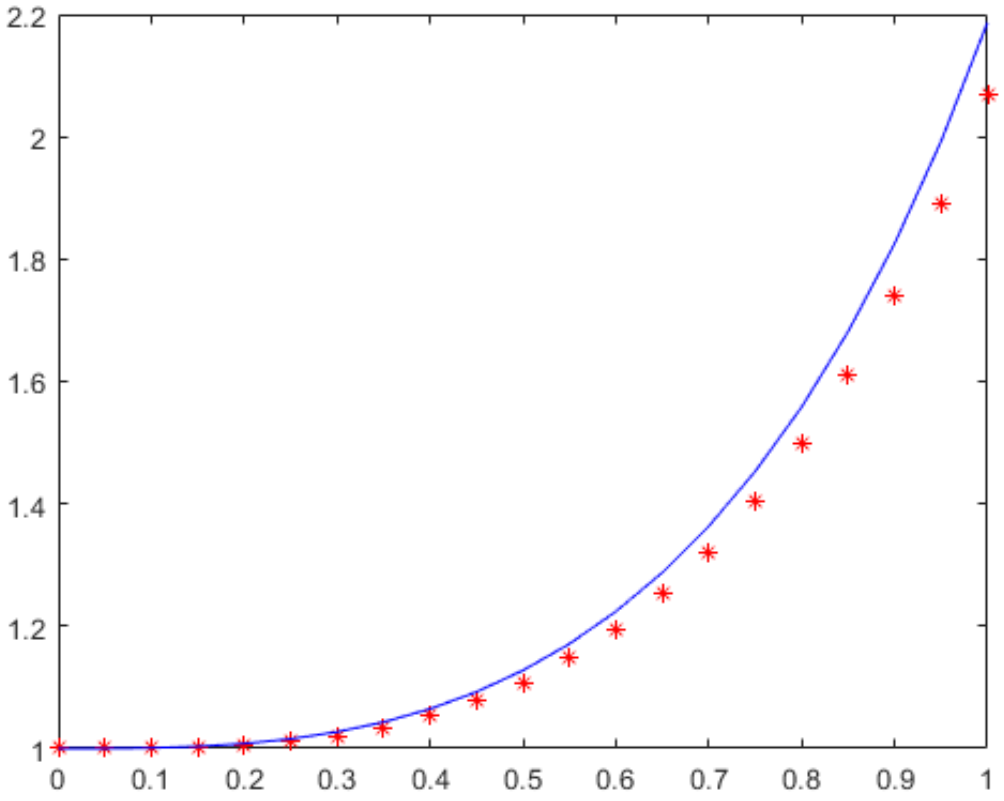
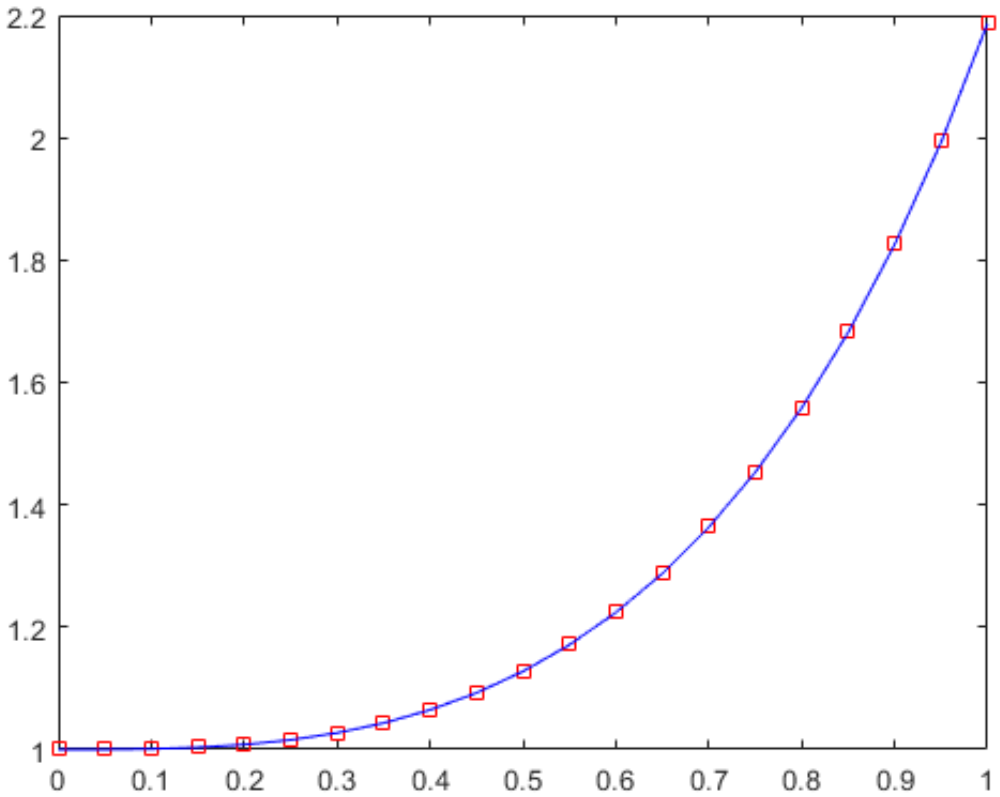
Euler's Method

```
g = 3*exp(t.^3/3)-2; % true solution
a = 0; b = 1; n = 20; % given parameters
h = (b-a)/n;

f = @(t,y)(t.^2.*(2+y));

t = a:h:b;
y(1) = 1; % initial y value

for i = 1:length(t)-1
    y(i+1) = y(i) + h*f(t(i),y(i)); % Euler's method
end

figure
plot(t,y,'r*'); hold on; plot(t,g,'b')
hold off
```



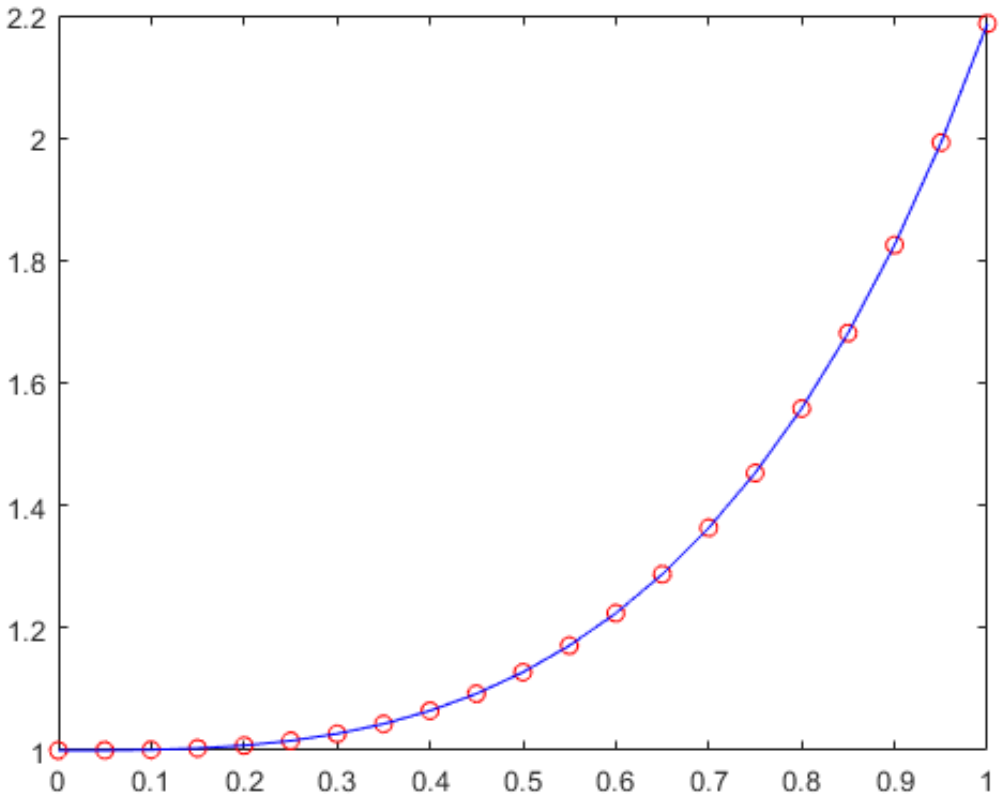
Modified-Euler Method

```
for i = 1:length(t)-1
    K1 = f(t(i),y(i));
    K2 = f(t(i)+h, y(i)+h*K1);
    y(i+1) = y(i) + h/2*(K1+K2); % Euler's method
end

figure
plot(t,y,'rs'); hold on; plot(t,g,'b')
hold off
```



RK4 Method

```
for i = 1:length(t)-1
    K1 = f(t(i),y(i));
    K2 = f(t(i)+h/2, y(i)+h/2*K1);
    K3 = f(t(i)+h/2, y(i)+h/2*K2);
    K4 = f(t(i)+h, y(i)+h*K3);
    y(i+1) = y(i) + h/6*(K1+2*K2+2*K3+K4); % Euler's method
end

figure
plot(t,y,'ro'); hold on; plot(t,g,'b')
hold off
```


2.2
2
1.8
1.6
1.4
1.2
1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1