1. **Problem 1**:

   a.

```
Euler Method Results (h=0.1):
t = 1.0, y_euler = 0.000000, y_exact = 0.000000, Error = 0.000000
t = 1.1, y_euler = 0.100000, y_exact = 0.109671, Error = 0.009671
t = 1.2, y_euler = 0.209920, y_exact = 0.229963, Error = 0.020043
t = 1.3, y_euler = 0.330193, y_exact = 0.361760, Error = 0.031567
t = 1.4, y_euler = 0.461475, y_exact = 0.506848, Error = 0.045373
t = 1.5, y_euler = 0.604547, y_exact = 0.667053, Error = 0.062506
t = 1.6, y_euler = 0.760321, y_exact = 0.844527, Error = 0.084206
t = 1.7, y_euler = 0.929843, y_exact = 1.041804, Error = 0.111961
t = 1.8, y_euler = 1.114300, y_exact = 1.261865, Error = 0.147565
t = 1.9, y_euler = 1.315022, y_exact = 1.508240, Error = 0.193218
t = 2.0, y_euler = 1.533485, y_exact = 1.785130, Error = 0.251645
```

   b.

```
Taylor Method (Order 2) Results (h=0.1):
t = 1.0, y_taylor = 0.000000, y_exact = 0.000000, Error = 0.000000
t = 1.1, y_taylor = 0.105000, y_exact = 0.109671, Error = 0.004671
t = 1.2, y_taylor = 0.220920, y_exact = 0.229963, Error = 0.009043
t = 1.3, y_taylor = 0.348384, y_exact = 0.361760, Error = 0.013376
t = 1.4, y_taylor = 0.488211, y_exact = 0.506848, Error = 0.018637
t = 1.5, y_taylor = 0.641370, y_exact = 0.667053, Error = 0.025683
t = 1.6, y_taylor = 0.808981, y_exact = 0.844527, Error = 0.035546
t = 1.7, y_taylor = 0.992315, y_exact = 1.041804, Error = 0.049489
t = 1.8, y_taylor = 1.192801, y_exact = 1.261865, Error = 0.069064
t = 1.9, y_taylor = 1.412028, y_exact = 1.508240, Error = 0.096212
t = 2.0, y_taylor = 1.651752, y_exact = 1.785130, Error = 0.133378
```

2. **Problem 2**:

a.

Runge-Kutta Order 4 (h = 0.05)

```
t = 0.00, u1_rk4 = 1.333333, u1_exact = 1.333333, Error = 0.000000
t = 0.00, u2_rk4 = 0.666667, u2_exact = 0.666667, Error = 0.000000
t = 0.05, u1_rk4 = 1.139911, u1_exact = 1.139911, Error = 0.000000
t = 0.05, u2_rk4 = -0.224368, u2_exact = -0.224368, Error = 0.000000
t = 0.10, u1_rk4 = 0.991960, u1_exact = 0.991960, Error = 0.000000
t = 0.10, u2_rk4 = -0.418454, u2_exact = -0.418454, Error = 0.000000
t = 0.15, u1_rk4 = 0.876953, u1_exact = 0.876953, Error = 0.000000
t = 0.15, u2_rk4 = -0.491162, u2_exact = -0.491162, Error = 0.000000
t = 0.20, u1_rk4 = 0.786880, u1_exact = 0.786880, Error = 0.000000
t = 0.20, u2_rk4 = -0.509981, u2_exact = -0.509981, Error = 0.000000
t = 0.25, u1_rk4 = 0.715924, u1_exact = 0.715924, Error = 0.000000
t = 0.25, u2_rk4 = -0.500563, u2_exact = -0.500563, Error = 0.000000
t = 0.30, u1_rk4 = 0.659847, u1_exact = 0.659847, Error = 0.000000
t = 0.30, u2_rk4 = -0.474382, u2_exact = -0.474382, Error = 0.000000
t = 0.35, u1_rk4 = 0.615471, u1_exact = 0.615471, Error = 0.000000
t = 0.35, u2_rk4 = -0.439418, u2_exact = -0.439418, Error = 0.000000
t = 0.40, u1_rk4 = 0.580378, u1_exact = 0.580378, Error = 0.000000
t = 0.40, u2_rk4 = -0.400717, u2_exact = -0.400717, Error = 0.000000
t = 0.45, u1_rk4 = 0.552676, u1_exact = 0.552676, Error = 0.000000
t = 0.45, u2_rk4 = -0.361858, u2_exact = -0.361858, Error = 0.000000
t = 0.50, u1_rk4 = 0.530888, u1_exact = 0.530888, Error = 0.000000
t = 0.50, u2_rk4 = -0.325221, u2_exact = -0.325221, Error = 0.000000
t = 0.55, u1_rk4 = 0.513860, u1_exact = 0.513860, Error = 0.000000
t = 0.55, u2_rk4 = -0.292260, u2_exact = -0.292260, Error = 0.000000
t = 0.60, u1_rk4 = 0.500679, u1_exact = 0.500679, Error = 0.000000
t = 0.60, u2_rk4 = -0.263784, u2_exact = -0.263784, Error = 0.000000
t = 0.65, u1_rk4 = 0.490625, u1_exact = 0.490625, Error = 0.000000
t = 0.65, u2_rk4 = -0.240123, u2_exact = -0.240123, Error = 0.000000
t = 0.70, u1_rk4 = 0.483130, u1_exact = 0.483130, Error = 0.000000
t = 0.70, u2_rk4 = -0.221273, u2_exact = -0.221273, Error = 0.000000
t = 0.75, u1_rk4 = 0.477740, u1_exact = 0.477740, Error = 0.000000
t = 0.75, u2_rk4 = -0.207003, u2_exact = -0.207003, Error = 0.000000
t = 0.80, u1_rk4 = 0.474085, u1_exact = 0.474085, Error = 0.000000
t = 0.80, u2_rk4 = -0.196935, u2_exact = -0.196935, Error = 0.000000
t = 0.85, u1_rk4 = 0.471855, u1_exact = 0.471855, Error = 0.000000
t = 0.85, u2_rk4 = -0.190618, u2_exact = -0.190618, Error = 0.000000
t = 0.90, u1_rk4 = 0.470789, u1_exact = 0.470789, Error = 0.000000
t = 0.90, u2_rk4 = -0.187575, u2_exact = -0.187575, Error = 0.000000
t = 0.95, u1_rk4 = 0.470666, u1_exact = 0.470666, Error = 0.000000
t = 0.95, u2_rk4 = -0.187332, u2_exact = -0.187332, Error = 0.000000
t = 1.00, u1_rk4 = 0.471303, u1_exact = 0.471303, Error = 0.000000
t = 1.00, u2_rk4 = -0.189420, u2_exact = -0.189420, Error = 0.000000
```

b.

Runge-Kutta Order 4 (h = 0.10)

```
t = 0.00, u1_rk4 = 1.333333, u1_exact = 1.333333, Error = 0.000000
t = 0.00, u2_rk4 = 0.666667, u2_exact = 0.666667, Error = 0.000000
t = 0.10, u1_rk4 = 0.991960, u1_exact = 0.991960, Error = 0.000000
t = 0.10, u2_rk4 = -0.418454, u2_exact = -0.418454, Error = 0.000000
t = 0.20, u1_rk4 = 0.786880, u1_exact = 0.786880, Error = 0.000000
t = 0.20, u2_rk4 = -0.509981, u2_exact = -0.509981, Error = 0.000000
t = 0.30, u1_rk4 = 0.659847, u1_exact = 0.659847, Error = 0.000000
t = 0.30, u2_rk4 = -0.474382, u2_exact = -0.474382, Error = 0.000000
t = 0.40, u1_rk4 = 0.580378, u1_exact = 0.580378, Error = 0.000000
t = 0.40, u2_rk4 = -0.400717, u2_exact = -0.400717, Error = 0.000000
t = 0.50, u1_rk4 = 0.530888, u1_exact = 0.530888, Error = 0.000000
t = 0.50, u2_rk4 = -0.325221, u2_exact = -0.325221, Error = 0.000000
t = 0.60, u1_rk4 = 0.500679, u1_exact = 0.500679, Error = 0.000000
t = 0.60, u2_rk4 = -0.263784, u2_exact = -0.263784, Error = 0.000000
t = 0.70, u1_rk4 = 0.483130, u1_exact = 0.483130, Error = 0.000000
t = 0.70, u2_rk4 = -0.221273, u2_exact = -0.221273, Error = 0.000000
t = 0.80, u1_rk4 = 0.474085, u1_exact = 0.474085, Error = 0.000000
t = 0.80, u2_rk4 = -0.196935, u2_exact = -0.196935, Error = 0.000000
t = 0.90, u1_rk4 = 0.470789, u1_exact = 0.470789, Error = 0.000000
t = 0.90, u2_rk4 = -0.187575, u2_exact = -0.187575, Error = 0.000000
t = 1.00, u1_rk4 = 0.471303, u1_exact = 0.471303, Error = 0.000000
t = 1.00, u2_rk4 = -0.189420, u2_exact = -0.189420, Error = 0.000000
```