Name:______________________________

640:244–01 SPRING 2007 Quiz 4 February 14, 2007

1. Solve the initial value problem $y'' - 4y' - 5y = 0, \qquad y(0) = 1, \quad y'(0) = -3.$

2. A certain numerical method, similar to those we have studied, is used to approximate the value $y(1)$ of solution of some specific problem $y' = f(t, y)$, $y(0) = y_0$ (with known solution). The error in the computation for various step sizes h is as given in the table:

h	0.08	0.04	0.02
Error	0.1906	0.0502	0.0126

(a) If the computation were carried out with step size $h = 0.01$, approximately what would the error be?

(b) Fill in the blank: the global error in the method is order h^p with $p =$_____

(c) Fill in the blank: the local truncation error in the method is order h^q with $q =$_____

Name:______________________________

640:244–02 SPRING 2007 Quiz 4 February 14, 2007

1. Solve the initial value problem $y'' + 4y' + 3y = 0, \qquad y(0) = -1, \quad y'(0) = 4.$

2. A certain numerical method, similar to those we have studied, is used to approximate the value $y(1)$ of solution of some specific problem $y' = f(t, y)$, $y(0) = y_0$ (with known solution). The error in the computation for various step sizes h is as given in the table:

h	0.08	0.04	0.02
Error	0.1906	0.0502	0.0126

(a) If the computation were carried out with step size $h = 0.01$, approximately what would the error be?

(b) Fill in the blank: the global error in the method is order h^p with $p =$______

(c) Fill in the blank: the local truncation error in the method is order h^q with $q =$______

Name:________________________________

640:244–03 SPRING 2007 Quiz 4 February 14, 2007

1. Solve the initial value problem $y'' + y' - 6y = 0, \qquad y(0) = 2, \quad y'(0) = -2.$

2. A certain numerical method, similar to those we have studied, is used to approximate the value $y(1)$ of solution of some specific problem $y' = f(t, y)$, $y(0) = y_0$ (with known solution). The error in the computation for various step sizes h is as given in the table:

h	0.08	0.04	0.02
Error	0.1906	0.0502	0.0126

(a) If the computation were carried out with step size $h = 0.01$, approximately what would the error be?

(b) Fill in the blank: the global error in the method is order h^p with $p =$_____

(c) Fill in the blank: the local truncation error in the method is order h^q with $q =$_____

Name:__________________________________

640:244–01 SPRING 2007 Quiz 3 February 7, 2007

1. A variable $N(t)$, taking values $-\infty < N < \infty$, satisfies $dN/dt = N(N-1)(N-3)$.
(a) Find the equilibrium (critical) values of N and classify each as stable or unstable.

(b) Find $\lim_{t\to\infty} N(t)$ for each initial condition below.
(i) $N(0) = 0$: (ii) $N(0) = 2$:

(iii) $N(0) = 5$:

2. Let $\phi(t)$ be a solution of the problem $y' = t/y$, $y(3) = 2$. **Use one step of Euler's method** with $h = 0.2$ to find an approximate value of $\phi(3.2)$.

Name:________________________________

640:244–02 SPRING 2007 Quiz 3 February 7, 2007

1. A variable $N(t)$, taking values $-\infty < N < \infty$, satisfies $dN/dt = N(N+2)(N+3)$.
(a) Find the equilibrium (critical) values of N and classify each as stable or unstable.

(b) Find $\lim_{t\to\infty} N(t)$ for each initial condition below.
(i) $N(0) = -3$: (ii) $N(0) = -1$:

(iii) $N(0) = 1$:

2. Let $\phi(t)$ be a solution of the problem $y' = t^2 + y$, $y(2) = 3$. **Use one step of Euler's method** with $h = 0.2$ to find an approximate value of $\phi(2.2)$.

Name:________________________________

640:244–03 SPRING 2007 Quiz 3 February 7, 2007

1. A variable $N(t)$, taking values $-\infty < N < \infty$, satisfies $dN/dt = N(N+1)(N-2)$.
(a) Find the equilibrium (critical) values of N and classify each as stable or unstable.

(b) Find $\lim_{t\to\infty} N(t)$ for each initial condition below.

(i) $N(0) = -2$:

(ii) $N(0) = 1$:

(iii) $N(0) = 2$:

2. Let $\phi(t)$ be a solution of the problem $y' = yt^2$, $y(2) = -2$. **Use one step of Euler's method** with $h = 0.2$ to find an approximate value of $\phi(2.2)$.