MATH 251
Summer 2003
Exam 1
July 2, 2003

ANSWERS:

1. (c); **2.** (d); **3.** (c).

4. (a) $y = t + \dfrac{12}{t^2}$, (b) $(0, \infty)$.

5. $x^4 + 2xy + y\sin x + y^2 = 4$.

6. (a) equilibrium solutions: $y = -10,\ 0,\ 10$; (b) $y = -10$ asymptotically stable; $y = 0$ semistable; $y = 10$ unstable; (c) $\lim\limits_{t\to\infty} y(t) = 0$, (d) $y(100) = 0$.

7. (a) $\dfrac{dQ}{dt} = 0.6 - \dfrac{3}{200}Q(t)$, $Q(0) = 0$; (b) $Q(t) = 40 - 40e^{-\frac{3t}{200}}$; (c) $T = \dfrac{200}{3}(\ln 20 - \ln 19)$.

8. $y(t) = 2e^t \cos 2t - 3e^t \sin 2t$.

9. $y(t) = C_1 t + C_2 t^{\frac{1}{2}}$.