

MATH 251
Summer 2002
Exam 1
June 27, 2002

ANSWERS:

1. (b); 2. (b); 3. (d); 4. (d).

5. $y = 3 + \sqrt{x^3 + 2x^2 + 2x + 1}$.

6. the tank is filled at $t = 300$ then the concentration at $t = 300$ is $c(300) = \frac{5}{64}$.

7. (a) equilibrium solutions: $y = -4, 0, 4$; (b) $y = -4$ unstable; $y = 0$ asymptotically stable; $y = 4$ unstable; (c) $\lim_{t \rightarrow \infty} y(t) = 4$.

8. (b) $x^2 + 2x^2y + y \ln x + y^3 = -2$.

9. (a) $y(t) = \frac{3\alpha - 4}{5}e^{-2t} + \frac{2\alpha + 4}{5}e^{3t}$; (b) $\alpha = -2$.

11. $y(t) = C_1t^3 + C_2t^{-4}$.