MATH 251
Exam I
July 16, 2009

ANSWER KEY

1. (a) E (b) H (c) D (d) A

2. $y = \sqrt{2e^t - 1}$

3. (a) $Q' + \dfrac{Q}{50} = 8, \qquad Q(0) = 100$

(b) $Q(t) = 400 - 300e^{-t/50}$

(c) $\lim_{t\to\infty} Q(t) = 400$

4. (a) $(0, \infty)$ (b) $y = \dfrac{1}{64}t^3 - \dfrac{1}{2}t$

5. (a) $y = 3e^t - e^{4t}$ (b) $\lim_{t\to\infty} y(t) = -\infty$

6. $W(y_1, y_2)(t) = t^4 \neq 0$

7. $y = C_1 t + C_2 t^{-2}$

8. $y = C_1 e^t + C_2 e^{-t} + A\cos(2t) + B\sin(2t) + (Ct^2 + Dt)e^t + E\cos(t) + F\sin(t)$

9. (a) *iii* (b) $y = e^t + te^t$