

**EM Midterm Solutions**

1.

a.

$$\begin{aligned}1) \quad & y = C e^{-1.5x} \\2) \quad & y = A \cos x + B \sin x\end{aligned}$$

b.

$$\begin{aligned}1) \quad & y = x + 0.5)e^x \\2) \quad & y^2 - 4x^2 = 12\end{aligned}$$

c.

$$\begin{aligned}1) \quad & y + 0.5 \sin 2y - 2x = C \\2) \quad & -\cot \frac{y}{x} = x^2 + C\end{aligned}$$

d.

$$\begin{aligned}1) \quad & y = 24/x \\2) \quad & \tanh x + \cot y = 0\end{aligned}$$

e.

$$\begin{aligned}1) \quad & \sin(x+y) + y^3 + y^2 = C \\2) \quad & \frac{y}{x} = C\end{aligned}$$

f.  $\frac{1}{y^2} = e^{x^2} + C e^{x^2+2x}$

2.

a.  $x = -\sin y + C_1 y + C_2$

b.  $y = (-1.4 + 8.8x)e^{3x}$

c.  $y = \frac{C_1 \cos x}{x} + \frac{C_2 \sin x}{x}$

d.  $y = e^{-2x}(2 \cos x - \sin x)$

e.  $y'' + 6.2y' + 14.02y = 0$

f.  $y = C_1 x^{1.4} + C_2 x^{1.6}$

3.  $t = 9.67 \text{ minutes}$

4.  $y(0.4) = 0.0684$