1. (a) $x = t, \quad y = -3, \quad z = 2$
   (b) $39x + 31y - z = 23$
   (c) $40x + 24y + 15z = 120$

2. (a) $\mathbf{r}(t) = \langle 2 + 3\cos(t), 90\sin^2(t), 3\sin(t) \rangle$ *(also correct if* $\sin(t)$ *and* $\cos(t)$ *are switched)*
   (b) $x^2 + z^2 = 9y^2$
   (c) cone

3. $3x + 4y - 5z = 0$

4. Saddle points at $(0, 0)$, $(1, 0)$, and $(-1, 0)$

5. $k = 12$

6. $\frac{\pi}{2}(\ln(2) - \frac{1}{2})$

7. (a) $T_2(x) = x + x^2$
   (b) $\frac{4.01}{6}10^{-6}$ *(other answers are possible)*

8. (a) $\displaystyle\sum_{k=2}^{\infty}(k-1)x^k$
   (b) $99(100!)$