MATH 126 FINAL EXAM ANSWERS
SPRING 2015

1. (a) ℓ and P intersect at the point $(-10, -13, 13)$.

   (b) $|\cos\theta| = \dfrac{11}{63}$

2. (a) T; (b) F; (c) F; (d) T; (e) F

3. (a) $y = -\dfrac{1}{2}x + \dfrac{3}{2}$

   (b) $(x, y) = (1, 0)$ and $(x, y) = (-3, 0)$

4. (a) $3\sqrt{5}$

   (b) $2x - z = 0$

   (c) $\dfrac{1}{5}$

   (d) $a_T = 0,\ a_N = 1$

5. (a) $\dfrac{1}{6}\left(\cos(2) - \cos(16)\right)$

   (b) $\dfrac{1}{2} - \dfrac{1}{2}\sin(1)$

6. $3x - y + 3z = 0$

7. $(\sqrt{2}, \sqrt{2}),\ (-\sqrt{2}, \sqrt{2}),\ (\sqrt{2}, -\sqrt{2}),\ (-\sqrt{2}, -\sqrt{2})$

8. (a) $\displaystyle\sum_{k=0}^{\infty} \frac{(-1)^k x^{3k+2}}{8^{k+1}(3k+2)}$

   (b) $-2 < x < 2$

   (c) $F^{(11)}(0) = -\dfrac{10!}{8^4}$

9. (a) $T_2(x) = 3(x-3) - \dfrac{1}{2}(x-3)^2$

   (b) $f(3.1) \approx 0.295$

   (c) On the interval $[3, 3.1]$,

$$|f'''(t)| = \left|\frac{6-t}{(t-2)^3}\right| = \frac{6-t}{(t-2)^3} < \frac{6}{(t-2)^3} \leq 6.$$

   So, $|f(3.1) - T_2(3.1)| \leq \frac{6}{3!}(0.1)^3 = 0.001$.