

Math 126 Autumn 2017  
Final Exam Answers

1. (a) **a**; (b) **a**; (c) **b**; (d) **c**

2. (a)  $\mathbf{T}(t) = \left\langle \frac{1}{\sqrt{2}}, \frac{-\sin t}{\sqrt{2}}, \frac{\cos t}{\sqrt{2}} \right\rangle$

(b)  $\mathbf{N}(t) = \langle 0, -\cos t, -\sin t \rangle$

(c)  $\kappa(t) = \frac{1}{2}$

3.  $f(x, y)$  has a local min at  $(0, 0)$ , a local max at  $(-5, 0)$ , and saddle points at  $(-3, 2)$  and  $(-3, -2)$ .

4.  $z = 14x + 8y + 33$

5.  $\frac{1}{3}(2\sqrt{2} - 1)$

6.  $\frac{\pi\sqrt{2}}{3}$

7. (a)  $T_2(x) = 1 + \frac{3}{2}(x - 1) + \frac{3}{8}(x - 1)^2$

(b)  $|T_2(x) - f(x)| \leq \frac{1}{16} \left( \frac{a}{\sqrt{1-a}} \right)^3$

(c) HINT: Solve  $\frac{1}{16} \left( \frac{a}{\sqrt{1-a}} \right)^3 = 0.004$ :  $a \approx 0.3279$ .

One acceptable answer is  $a = 0.32$ .

8. (a)  $f(x) = \sum_{k=0}^{\infty} \frac{(-1)^k x^{6k+7}}{2k+1}$

(b)  $-1 < x < 1$

(c)  $f^{(2017)}(0) = -\frac{2017!}{671}$