Calculus III. Test 2 Review

Answers:

I.

1. 6   ($g_x(1,0) = 3$)

2. 0   Note: thus this θ direction is perpendicular to gradient, so parallel (tangent) to level curve!
   ($\langle 9, -3\sqrt{3}\rangle$)

3. 3 ($D = 27$)

4. $z + y = \pi$ ($\langle 0, -1, -1\rangle$)

5. $\frac{3}{2}$ ($\langle\frac{3}{2}, 0\rangle$)

6. $\frac{1}{2}$ ($\langle\frac{3}{2}, 0, -1\rangle$)

7. 1 , saddle

II.

1. $\langle 5, -2\rangle$

2. $\frac{4}{\sqrt{13}}$

3. $-\sqrt{29}$

4. $z = 2$

5. min

6. 5 (for $z = f(x, y)$)

7. 8 (for $z = f(x, y)$)

III.

1. (0,0) is a saddle; (0,-2) is a max

2. $D = 12$, min

3. $\pi - 1$

4. e^{16} is a max; e^{-16} is a min.

5. 81 is a max; 1/81 is a min.