

Review Guide and Practice Test 3rd Test Calc IV Partial Answer Key

0.

(0,0,1) is a critical point – saddle

(0,1, e⁻¹) and (0,-1, e-1) are abs mins.

(1,0,e) and (-1, 0, e) are abs maxs.

1. $(x,y,z)=(2/3,-4/3,4/3)$

2.

$$2x = \lambda + \mu(2x)$$

$$2x = 2\lambda + \mu(2y)$$

$$2z = \lambda - \mu$$

$$x + 2y + z = 10$$

$$z = x^2 + y^2$$

3.

$$1 = \mu(2x)$$

$$2 = \lambda + \mu(2y)$$

$$3 = \lambda$$

$$y + z = 1$$

$$x^2 + y^2 = 2.$$

4b) $\int_0^2 \int_{-1}^{1-y} (4 - y) \, dx \, dy$

5.

$$\int_0^2 \int_{x^2}^{2x} 1 \, dy \, dx$$

6. $\int_1^2 \int_0^y x^2 y^2 \, dx \, dy$

Evaluates to 7/2

7. See text

8. See text

9. $\int_0^2 \int_1^{2\pi} r^2 \, dr \, d\theta$ evaluates to $\frac{14}{3} \pi$