

Exam I. Answers to even review problems

p. 833 #6. $\pm \frac{1}{3\sqrt{6}} \langle 7, 2, -1 \rangle$

#12. 87 joules

#16. $x = -6 + 8t, y = -1 - 2t, z = 5t$

#28. A plane. Intercepts 2, 3, 4

#30. Ellipsoid

#38. $(3, \pi/4, \cos^{-1}(-\frac{1}{3}))$

#40. upper half of a cone

#42. Circular cylinder, axis $\begin{cases} x=1 \\ y=0 \end{cases}$

p. 868 #6 (a). $(\frac{15}{8}, 0, -\ln 2)$

(b) $x = 1 - 3t, y = 1 + 2t, z = t$

(c) $3x - 2y - z = 1$

#8. $L = \frac{2}{27} (13^{3/2} - 8)$

#10. $t = \ln(1 + \frac{5}{\sqrt{3}})$

#18. $\langle t + t^3/6, 2t + t^2/2, t + t^4/12 \rangle$

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p. 961 #2. $\{z \geq x^2 + y^2\}$

#6. parabolas with vertex
at $(0, k/4)$: $4(y - k/4) = -x^2$

#8. Limit DNE

#12. $g_x = -x(x + 2y)^{-3/2}$

#18. $f_{xx} = 6x \ln(x-y) + x^2(5x-6y)/(x-y)^2$

$$f_{yy} = -x^3/(x-y)^2$$

$$f_{xy} = f_{yx} = x^2(3y-2x)/(x-y)^2$$

#20. $f_{xx} = 0$, $f_{yy} = x e^y \cos z$,

$$f_{zz} = -x e^y \cos z,$$

$$f_{xy} = f_{yx} = e^y \cos z$$

$$f_{xz} = f_{zx} = -e^y \sin z, \quad f_{yz} = f_{zy} = -x e^y \sin z$$

#30. $dz = (2x \tan^{-1} y) dx + \frac{x^2}{y^2+1} dy$