Math 20C

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Answers to even-numbered exercises from sections 14.8, 15.1

§**14.8**

(16) $x = y = z = 25$, and the maximum volume is $15,625$ cm^3.

(26) Use Lagrange multipliers with $f(x, y, z) = x^2 + y^2 + z^2$ and $g(x, y, z) = ax + by + cz - d$. The closest point is $P = \frac{d}{a^2+b^2+c^2} \cdot \langle a, b, c \rangle$. The distance from this point P to the origin O is $d/\sqrt{a^2 + b^2 + c^2}$. Notice that the vector pointing from O to P is orthogonal to the plane.

§**15.1**

(24) 0

(28) $\dfrac{e^2 - 1}{2} \cdot \dfrac{e^6 - 1}{3} = \dfrac{e^8 - e^6 - e^2 + 1}{6}$.

(38) $(e^2 - 1) \cdot (1 - \sqrt{2}/2)$

(44) The given integral is equal to $\int_0^1 \ln(1 + y)\, dy$, which is equal to $2 \ln 2 - 1$.