

SPRING 2020 MATH 26100, QUIZ # 9

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Name: \_\_\_\_\_

To receive full credit you must **show all your work**. Circle your answers.  
Submit your solution for grading to canvas by 6:00 PM on Monday, March 30, 2020.  
You can get extra 5 points, if submit your solution in LaTeX (like this file).

**Problem.** Use the spherical coordinates,

$$x = \rho \sin \phi \cos \theta, \quad y = \rho \sin \phi \sin \theta, \quad z = \rho \cos \phi;$$
$$\rho^2 = x^2 + y^2 + z^2, \quad dV = \rho^2 \sin \phi \, d\rho \, d\phi \, d\theta,$$

to calculate the integral

$$\iiint_E z^2 dV,$$

where  $E$  is the solid hemisphere  $x^2 + y^2 + z^2 \leq 1, z \geq 0$ .

(10 points)