1.(1 pt)

Using polar coordinates, evaluate the integral $\iint_R \sin(x^2 + y^2)dA$ where R is the region $16 \leq x^2 + y^2 \leq 64$.

2.(1 pt)

Using polar coordinates, evaluate the integral which gives the area which lies in the first quadrant between the circles $x^2 + y^2 = 4$ and $x^2 - 2x + y^2 = 0$.

3.(1 pt)

Use the polar coordinates to find the volume of a sphere of radius 7.

4.(1 pt)

A cylindrical drill with radius 5 is used to bore a hole throught the center of a sphere of radius 8. Find the volume of the ring shaped solid that remains.

5.(1 pt)

A. Using polar coordinates, evaluate the improper integral $\iint_{R^2} e^{-3(x^2+y^2)}\, dx\, dy$.

B. Use part A to evaluate the improper integral $\int_{-\infty}^{\infty} e^{-3x^2}\, dx$.

6.(1 pt)

A sprinkler distributes water in a circular pattern, supplying water to a depth of e^{-r} feet per hour at a distance of r feet from the sprinkler.

A. What is the total amount of water supplied per hour inside of a circle of radius 17?

_____ ft^3/h

B. What is the total amount of water that goes throught the sprinkler per hour?

_____ ft^3/h