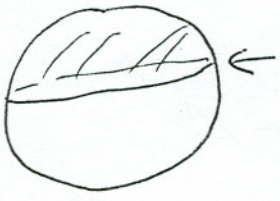
126

9. Evaluate $\int\int_R e^{x^2+y^2}\,dA$, where R is the region enclosed by $x^2+y^2=4$.

$$\int_0^{2\pi}\int_0^2 re^{r^2}\,dr\,d\theta = \int_0^{2\pi} \tfrac{1}{2}e^{r^2}\Big]_0^2\,d\theta = \left(\tfrac{e^4}{2}-\tfrac{1}{2}\right)\theta\Big]_0^{2\pi} = (e^4-1)\pi$$

This is 16.4/11

10. Find the volume of the solid bounded by $z=\sqrt{25-x^2-y^2}-4$ and the xy-plane.



$0=\sqrt{25-r^2}-4$

$16=25-r^2$

$r^2=25-16$

$r=3$

$$\text{Vol} = \int_0^{2\pi}\int_0^3 r\left(\sqrt{25-r^2}-4\right)dr\,d\theta = 2\pi\left(-\tfrac{1}{2}\tfrac{2}{3}(25-r^2)^{\frac{3}{2}}-2r^2\right)\Big]_0^3$$

$$= 2\pi\left(-\tfrac{1}{3}(16)^{\frac{3}{2}}-18+\tfrac{1}{3}(125)\right)$$

$$= 2\pi\left(\tfrac{1}{3}(125-64)-18\right) = \tfrac{2\pi}{3}(125-64-54) = \frac{14\pi}{3}$$

By the way this problem is one half of 16.4/23 with $a=5$ and $b=4$

The answer is $\frac{\pi}{3}d^2(39-d) = \frac{\pi}{3}(15-1)$ where $d=a-b=1$