Classwork 10:

1. Use spherical coordinates to calculate the volume of a sphere of radius R.

$$V = \int dx\,dy\,dz = \int_{x^2+y^2+z^2 \le R^2} dx\,dy\,dz$$

Classwork 10: Matrices of dot Products

We had already

$$\begin{array}{c|cc} & \hat{x} & \hat{y} \\ \hat{s} & \cos\phi & \sin\phi \\ \hat{\phi} & -\sin\phi & \cos\phi \end{array}$$

Now, fill out:

$$\begin{array}{c|cc} & \hat{s} & \hat{z} \\ \hat{r} & & \\ \hat{\theta} & & \end{array}$$

$$\begin{array}{c|ccc} & \hat{x} & \hat{y} & \hat{z} \\ \hat{r} & & & \\ \hat{\theta} & & & \\ \hat{\phi} & & & \end{array}$$

Classwork 10

3. Use cylindrical coordinates in the plane to calculate

$$\int_{-\infty}^{+\infty} e^{-x^2}\, dx$$