Worksheet for November 7

Problems marked with an asterisk are to be placed in your math diary.

(1.*) Homework problems 41, 52, 55, 107, 110 from OS, Sections 3.2 and 3.3.

(2.*) Find the length of the curve C obtained by intersecting the sphere if radius 2 centered at the origin with the plane $z = \sqrt{2}$.

Bonus Points 7. Let $\mathbf{r}(t) = (x(t), y(t), z(t))$ and $\mathbf{s}(t) = (u(t), v(t, w(t))$ be vector valued functions. For one bonus point each, give proofs of the following identities. Due Friday, at the start of class.

   (i) $(\mathbf{r}(t) \cdot \mathbf{s}(t))' = \mathbf{r}'(t) \cdot \mathbf{s}(t) + \mathbf{r}(t) \cdot \mathbf{s}'(t)$.
   (ii) $\mathbf{r}(g(t))' = g(t)\mathbf{r}'(g(t))$, for a scalar function $g(t)$.
   (iii) $(\mathbf{r}(t) \times \mathbf{s}(t))' = \mathbf{r}'(t) \times \mathbf{s}(t) + \mathbf{r}(t) \times \mathbf{s}'(t)$.