**MATH 406 – HOMEWORK 7**

*(due Monday 23 April 2012)*

**1.** Assume that $ord_n a = k$ and that $d|k$. Show that there is some $b$ with $ord_n b = d$.

**2.** Suppose that $\bar{r}$ is an inverse of $r$ modulo $n$. Show that $ord_n r = ord_n \bar{r}$.

**3.** Find a primitive root of 13. Show all of your work.

**4.** Show that 20 has no primitive roots.

**5.** Find all primitive roots of 18. Explain carefully, and express your answers as least positive residues. Show all necessary calculations – you do not need a calculator.

**NOTE:** Explain your work clearly. Your solutions must include enough detail to justify your conclusions.