

**MAT 129**  
**Quiz #2**  
**February 11, 2005**

**Name:** \_\_\_\_\_

You may not use your notes. Please show all of your work. An answer without justification will receive little credit.

(1) Compute

$$\prod_{k=2}^4 k^2 - 1.$$

$$\prod_{k=2}^4 k^2 - 1 = (2^2 - 1)(3^2 - 1)(4^2 - 1) = 3 \cdot 8 \cdot 15 = 360.$$

(2) Let  $C = \{x \in \mathbb{Z} : x|15\}$  and let  $D = \{x \in \mathbb{Z} : x|30\}$ . Show that  $C \subset D$ .

**Two Approaches**

- a.)  $C = \{-15, -5, -3, -1, 1, 3, 5, 15\}$  and  
 $D = \{-30, -15, -10, -6, -5, -3, -2, -1, 1, 2, 3, 5, 6, 10, 15, 30\}$ . Now note that each element of  $C$  is also in  $D$ . Thus  $C \subset D$ .
- b.) Let  $c \in C$ . Then  $c|15$ . So, there exists  $k \in \mathbb{Z}$  such that  $15 = kc$ . This implies that  $30 = 2kc = c(2k)$ . Let  $\ell = 2k$ . Then  $\ell \in \mathbb{Z}$  and  $c\ell = 30$ . So,  $c|30$ . Therefore  $c \in D$ . Since  $c \in C$  was arbitrary, it follows that  $C \subset D$ .