

Show all work clearly and in order. Please box your answers. 10 minutes.

1. Compute each of the following:

(a)  $67 \div 13$

$$67 = 13 \cdot 5 + 2 \quad \text{and} \quad 0 \leq 2 < 13$$
$$\text{So } 67 \div 13 = \boxed{5}$$

(b)  $67 \bmod 13$

using (a):  $67 = 13 \cdot 5 + 2 \quad \text{and} \quad 0 \leq 2 < 13$

$$67 \bmod 13 = \boxed{2}$$

(c)  $-67 \div 13$

$$-67 = 13 \cdot (-6) + 11 \quad \text{and} \quad 0 \leq 11 < 13$$
$$\text{So } -67 \div 13 = \boxed{-6}$$

(d)  $-67 \bmod 13$  using (c):

$$-67 = 13 \cdot (-6) + 11 \quad \text{and} \quad 0 \leq 11 < 13$$
$$\text{So } -67 \bmod 13 = \boxed{11}$$

2. Show:  $\forall n \in \mathbb{Z}, n^2 + n - 1$  is odd.

proof. SEE EXAMPLE 3.13 on p117.  $\square$

Don't forget we are considering any integer  $n$  (so  $n$  is either even or odd.  
This is the key here).