Quiz # 9   Name: _____Key_____

You must show your work to get full credit.

1. Find the following: $18 \operatorname{div} 7$ = 2

$$18 = 2(7) + 4$$

$18 \bmod 7$ = 4

$-18 \operatorname{div} 7$ = -3

$$-18 = -21 + 3$$
$$= -3(7) + 3$$

$-18 \bmod 7$ = 3

2. Show that if $n \bmod 5 = 3$, then $n^2 \bmod 5 = 4$.

If $n \bmod 5 = 3$, then $n = 5q + 3$ for some q.

Thus $n^2 = (5q + 3)^2$

$$= 25q^2 + 30q + 9$$
$$= 25q^2 + 30q + 5 + 4$$
$$= 5(5q^2 + 6q + 1) + 4$$
$$= 5(\text{integer}) + 4$$

Thus $n^2 \bmod 5 = 4$