Question 5

Tobias Famos

A) Find gcd(85327,59840) = 11 Using Euclid Algorithm.

a	b	a/b	remainder
85327	/ 59840 =	1	25487
59840	/ 25487 =	2	8866
25487	/ 8866 =	2	7755
8866	/ 7755 =	1	1111
7755	/ 1111 =	6	1089
1111	/ 1089 =	1	22
1089	/ 22 =	49	11
22	/ 11 =	2	0

B) As the gcd of the two is not 1 they are not relatively prime.

C) Using Fermat's theorem find $4^{225} \bmod 13$

Fermat Theorem: $a^{p-1} \equiv 1 \bmod p$

$4^{12} \equiv 1 \bmod 13$ Thus $4^{225} \equiv 4^{9} \bmod 13$

→ can't find a way to simplify more.

D) Is 104717 prime?

Find k and q such that: $104717 - 1 = 2^k \cdot q$

$k = 2 \quad q = 26179 \quad a = 8$

$8^{26179} \mod 104717$

⇒ guess wrong approach, calculator has overflow