1 modular arithmetic

Solution of $a^b \ \% \ c$ for large a and b:
if(a, c) coprime:
$a^b \ \% \ c = a^{(b \ \% \ phi(c))} \ \% \ c$
else if($b >= phi(c)$)
$a^b \ \% \ c = a^{(b \ \% \ phi(c) \ + \ phi(c))} \ \% \ c$
else $a^b \ \% \ c \ = \ a^b \ \% \ c$

mod inverse: $a^{m-2} \ mod \ m$