Let p be a prime number. Call a positive integer n *interesting* if

$$x^n - 1 = (x^p - x + 1)f(x) + pg(x)$$

for some polynomials f and g with integer coefficients.

a) Prove that the number $p^p - 1$ is interesting.

b) For which p is $p^p - 1$ the minimal interesting number?