1. If x is m-bits long and y is n-bits long, the run time of the function is O(m*n). The function is called recursively n times (y/2 performs a right shift, so n bits requires n shifts to complete) and the addition operation x + 2z requires one operation for every bit in x. In summary, there are n recursive calls, each requiring m operations, for a total of O(m*n).

2. gcd(770,546)

    a. 770 = 2 * 5 * 7 * 11

       546 = 2 * 3 * 7 * 13

       gcd(770,546) = 2 * 7 = 14

    b. gcd(a,b) = gcd(b, a mod b)

       gcd(770,546) = gcd(546,224) = gcd(224,98) = gcd(98,28) = gcd(28,14) = gcd(14,0)

       gcd(770,546) = 14

    c. eE(a,b): //(extendedEuchlid)

         x',y',d = eE(b, a mod b)

           return y', x' - floor(a/b)*y', d

Iteration	x', y' d	return value
eE(770,546)	7,-17,14	-17,24,14
eE(546,224)	-3,7,14	7,-17,14
eE(224,98)	1,-3,14	-3,7,14
eE(98,28)	0,1,14	1,-3,14
eE(28,14)	1,0,14	0,1,14
eE(14,0)		1,0,14

       extendedEuclid(770,546) = -17,24,14

         a = 770, b = 546, d = 14, x = -17, y = 24

         -17*770 + 24*546 = 14; gcd(770,546) = 14

3. $7^{7293} \bmod 342 \equiv (7^3)^{2431} \bmod 342 \equiv (343)^{2431} \bmod 342 \equiv 1^{2431} \bmod 342 \equiv 1$