Practice Exam 1

(1) Let F_n represent the nth Fibonacci number. What is $F_4 \times F_5$? (recall $F_0 = 0, F_1 = 1, F_2 = 1, \dots$)

(2) What is $[3, 2, 3]$ as a fraction in lowest terms? (recall $[3, 2, 3]$ is continued fraction notation)

(3) What is $\phi(7^2 \times 5)$?

(4) Use the extended Euclid's Algorithm to find $gcd(30, 44)$ as well as x, y such that $30x + 44y = gcd(30, 44)$?

(5) What is $(21^2 + 13^2 + 20) \bmod 10$ equal?

(6) If the following are the first 11 digits of a bar code, what is the 12th (or check) digit?

3 3 3 3 3 3 3 3 3 3 3

(7) What does $5^{31} \bmod 7$ equal? What is $\phi(7)$?

(8) What is $\phi(35) = \phi(5 \times 7)$ and what does $4^{49} \bmod 35$ equal?

(9) Which of the following are rational?

$\sqrt{11 \cdot 2},\ \sqrt{11^2 \cdot 2^2},\ \sqrt{11^3 \cdot 2^3},\ \sqrt{11^4 \cdot 2^4}$

(10) What is $0.\overline{30} = 0.3030\dots$ as a fraction in lowest terms?

For the next problem consider the following substitution code

A	B	C	D	E	F	G	H	I	J	K	L	M
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
T	H	E	Q	U	I	C	K	B	R	O	W	N
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
F	X	J	M	P	D	V	L	A	Z	Y	G	S

(11) What do you get when you encode the phrase

FUN EXAM?