

(Math 170) Homework 5:

Due October 18, 2007

- (1) Let F_n represent the n th Fibonacci number. What is $F_2 \times F_7$? (recall $F_0 = 0, F_1 = 1, F_2 = 1, \dots$)
- (2) What is $[3, 3, 3]$ as a fraction in lowest terms? (recall $[3, 3, 3]$ is continued fraction notation)
- (3) What is $\phi(2 \times 7 \times 13)$?
- (4) Use the extended Euclid's Algorithm to find $\gcd(25, 33)$ as well as x, y such that $60x + 27y = \gcd(60, 27)$?
- (5) What does $(15 + 8 \cdot 14 + 9^2) \bmod 7$ equal?
- (6) If the following are the first 11 digits of a bar code, what is the 12th (or check) digit?

1 2 3 3 2 1 1 2 3 2 1

- (7) What does $4^{42} \bmod 5$ equal? What is $\phi(5)$?
- (8) What is $\phi(22) = \phi(2 \times 11)$ and what does $3^{32} \bmod 22$ equal?
- (9) Which of the following are rational?

$$\sqrt{2^5}, \sqrt{2^2 \cdot 11^2}, \sqrt{2 \cdot 11 \cdot 13}, \sqrt{5^2}$$

- (10) What is $0.\overline{42} = 0.4242\dots$ as a fraction in lowest terms?

For the next problem consider the following substitution code

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
<i>T</i>	<i>H</i>	<i>E</i>	<i>Q</i>	<i>U</i>	<i>I</i>	<i>C</i>	<i>K</i>	<i>B</i>	<i>R</i>	<i>O</i>	<i>W</i>	<i>N</i>
<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
<i>F</i>	<i>X</i>	<i>J</i>	<i>M</i>	<i>P</i>	<i>D</i>	<i>V</i>	<i>L</i>	<i>A</i>	<i>Z</i>	<i>Y</i>	<i>G</i>	<i>S</i>

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

HAPPY HOMEWORK!