

1. Select from the following list of values two or three that are most important to you: Athletic ability, being good at art, creativity, independence, living in the moment, membership in a social group (such as your community, racial group, or school club), music, politics, relationships with friends or family, religious values, and sense of humor.
 - Write about one or more times in your life when these values were important to you. Write a few sentences about why they were important to you.
2. Write a complete characterization of the numbers that can be written as the difference of two squared integers. You need to precisely name the set and prove that the set really is exactly all such differences.
3. We've dealt with base 10 and base 4 arithmetic. Now imagine a number system that is base $2i$, where i is the square root of -1 , and only uses the symbols $0, 1, 2, 3$ (in that order) and a decimal point (strictly speaking, it should be called a radix point in non-base-10).

- (a) Translate the following numbers, written base $2i$, into base 10:

10, 100, 101, 102, 103, 200, 201, 202, 203, 1000, 0.1

- (b) Translate the following numbers, written base 10, into base $2i$:

$3, 5, 10, 20, -3, -\frac{1}{2}i, -0.25, -\frac{3}{16}$

- (c) Explain how to write every natural number in base $2i$.
- (d) Explain how to write every imaginary natural number (every natural number times i) in base $2i$.
- (e) Which rational numbers can you write with terminating "decimals", base $2i$?
- (f) Which numbers can you write if you allow infinite "decimals"? Try to get a complete characterization. Prove it as best as you can.