Math 170

Practice Final Exam 1

Name _____ Section Number _____

(1) Suppose A is a symbol which represents ten and B is a symbol which represents eleven. What is $B9A$ base 12 expressed base 7?

(2) What is 123.45 base 8 expressed base 10?

(3) What is $123.\overline{123}$ base 5 as a fraction (base 10) in lowest terms?

(4) What is $[1; 4, 1, 4, 1]$ expressed as a fraction in lowest terms?

(5) What does $[1; \overline{4, 1}]$ equal?

(6) Which of the following are rational numbers?

(i) $\sqrt{2^4 \cdot 3^7 \cdot 5^1 1}$

(ii) $\sqrt[4]{2^4 \cdot 5^4 \cdot 13^1 2}$

(iii) $\sqrt[3]{2^3 \cdot 3^9 \cdot 11^1 2}$

(iv) $\sqrt[5]{2^9 \cdot 3^7 \cdot 5^5}$

(7) Let $R_{n+1} = 3R_n^2 - 2R_n - 1$ be a mathematical model with $R_0 = 0$. What is R_3?

(8) Let $R'_{n+1} = 5(R'_n)^3 - 19R'_n$ be a mathematical model. How many equilibrium points does R'_n have and what are they?

(9) Consider the mathematical model $M_{n+1} = M_n^2 + (1 - 5i)$ with $M_0 = 0$. What is M_3?

(10) What are the values of x such that $3x^2 - x + 2 = 0$?

(11) What does $(2 + 7i) \times (7 - 5i)$ equal? What about $(2 + 7i) + (7 - 5i)$?

(12) What does $\frac{-5+3i}{2+i}$ equal? What about $(-5+3i)-(2+i)$?

(13) Let $M_{n+1} = (M_n)^2 + 4$ be a mathematical model. How many real equilibrium points does M_n have? What (if any) are they? How many other complex equilibrium points does M_n have? What (if any) are they?

(14) Let $F_1 = 1$, $F_2 = 1$ and $F_{n+2} = F_{n+1} + F_n$ describe the Fibonacci numbers. What does $F_6 + F_9 + F_{10}$ equal?