Practice Final 1 for Math 170 (Fall 2007)

(Math 170) Practice Final 1:

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

(2) Let $R'_{n+1} = 2(R'_n)^2 - 3R'_n$ be a mathematical model. How many equilibrium points does R'_n have and what are they?

(3) What is 21 base 10 expressed in base 4?

(4) What is 132.3 base 4 expressed in base 10?

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

(6) What are the values of x such that $x^2 + 4x - 4 = 0$?

(7) What does $(2 - 3i) \times (2 + i)$ equal? What about $(2 - 3i) + (2 + i)$?

(8) 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?

(9) Which of the following pairs of functions are inverses of each other?

- $f(x) = 4x + 2$, $g(y) = y/4 - 1/2$
- $f(x) = 2x - 5$, $g(y) = (y + 5)/2$
- $f(x) = 2x + 4$, $g(y) = y/2 - 2$

– $f(x) = 2x + 9$, $g(y) = y/3 + 3$

(10) What is $\log_7(6)$ to three decimal places?

(11) Consider the infinite sum

$$\frac{1}{3} - \frac{2}{9} + \frac{4}{27} + \dots$$

Does it converge to a real number? If so what is the number?

(12) Consider the infinite sum

$$9 + 3 + 1 + \frac{1}{3} + \frac{1}{9} + \dots$$

Does it converge to a real number? If so what is the number?