

Potential Exam Questions for the Final in
Math 170 (Fall 2007)

- (1) Let $Q_{n+1} = Q_n^2 + Q_n$ be a mathematical model with $Q_0 = 1$. What is Q_4 ?
- (2) Let $P_{n+1} = (P_n)^2 - 2P_n + 1$ be a mathematical model with $P_0 = 1$. What is P_3 ?
- (3) Let $R_{n+1} = 2R_n^2 - 3R_n - 1$ be a mathematical model with $R_0 = 1$. What is R_3 ?
- (4) Let $Q'_{n+1} = (Q'_n)^2 - 4Q'_n$ be a mathematical model. How many equilibrium points does Q'_n have and what are they?
- (5) Let $P'_{n+1} = (P'_n)^3 - 8P'_n$ be a mathematical model. How many equilibrium points does P'_n have and what are they?
- (6) Let $R'_{n+1} = 2(R'_n)^3 - 7R'_n$ be a mathematical model. How many equilibrium points does R'_n have and what are they?
- (7) What is 18 base 10 expressed in base 3?
- (8) What is 15 base 10 expressed in base 4?
- (9) What is 13 base 10 expressed in base 2?
- (10) What is 122.1 base 3 expressed in base 10?
- (11) What is 103.1 base 4 expressed in base 10?
- (12) What is 1101.01 base 2 expressed in base 10?
- (13) Consider the mathematical model $M_{n+1} = M_n^2 + (1 + i)$ with $M_0 = 0$. What is M_3 ?

- (14) Consider the mathematical model $M_{n+1} = M_n^2 + i$ with $M_0 = 0$. What is M_4 ?
- (15) Consider the mathematical model $M_{n+1} = M_n^2 + (2 - i)$ with $M_0 = 0$. What is M_3 ?
- (16) What are the values of x such that $x^2 - 2x + 2 = 0$?
- (17) What are the values of x such that $x^2 + 4x + 5 = 0$?
- (18) What are the values of x such that $x^2 + 4x + 3 = 0$?
- (19) What does $(2 + i) \times (1 - 2i)$ equal? What about $(2 + i) + (1 - 2i)$?
- (20) What does $(3 - i) \times (2 + i)$ equal? What about $(3 - i) + (2 + i)$?
- (21) What does $(3 - 2i) \times (1 + i)$ equal? What about $(3 - 2i) + (1 + i)$?
- (22) Let $M_{n+1} = (M_n)^2 + 2$ 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?
- (23) Let $M_{n+1} = (M_n)^2 - 2$ 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?
- (24) Let $M_{n+1} = (M_n)^2 + 3$ 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?

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

– $f(x) = 4x + 2, g(y) = (y - 2)/4$

– $f(x) = 3x + 1, g(y) = (y + 1)/3$

– $f(x) = 3x + 2, g(y) = (y - 2)/3$

– $f(x) = 4x + 1, g(y) = (y + 1)/4$

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

– $f(x) = 5x + 2, g(y) = (y - 2)/5$

– $f(x) = 4x + 4, g(y) = y/4 - 1$

– $f(x) = 3x - 3, g(y) = (y + 3)/3$

– $f(x) = 4x - 2, g(y) = (y + 2)/4$

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

– $f(x) = 2x + 5, g(y) = (y - 5)/2$

– $f(x) = 3x + 5, g(y) = (y + 1)/3$

– $f(x) = 2x + 4, g(y) = y/2 - 2$

– $f(x) = 3x + 9, g(y) = y/3 + 3$

(28) What is $\log_3(4)$ to three decimal places?

(29) What is $\log_4(5)$ to three decimal places?

(30) What is $\log_5(6)$ to three decimal places?

(31) Consider the infinite sum

$$2 + \frac{2}{3} + \frac{2}{9} + \dots$$

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

(32) Consider the infinite sum

$$2 - \frac{2}{3} + \frac{2}{9} - \dots$$

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

(33) Consider the infinite sum

$$1 + \frac{4}{3} + \frac{16}{9} + \dots$$

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

(34) Consider the infinite sum

$$3 + 2 + \frac{4}{3} + \frac{8}{9} + \dots$$

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

(35) Consider the infinite sum

$$3 - 2 + \frac{4}{3} - \frac{8}{9} + \dots$$

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

(36) Consider the infinite sum

$$4 - 2 + 1 - \frac{1}{2} + \frac{1}{4} + \dots$$

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