

MA131 Calculus for Life and Management Sciences A

Exam 1 Review Questions

September 6, 2009

1. Given the difference equation $y_{n+1} = -2y_n + 5$, $y_0 = 1$, compute y_1 , y_2 , and y_3 .
2. Solve the above difference equation. (Find y_n)
3. Find y_{20}
4. Is the difference equation oscillating or monotonic?
5. Is the difference equation bounded or unbounded?
6. 1000 dollars is deposited into an account paying 5% interest, compounded annually. A deposit of 200 dollars is made at the end of each year. What is the difference equation that describes y_{n+1} in terms of y_n ?
7. Solve the difference equation. (Find y_n)
8. Compute the balance after 20 years
9. Is the difference equation oscillating or monotonic?
10. Is the difference equation bounded or unbounded?
11. Is the difference equation constant?
12. Write the appropriate equation and find the expected value after 2 years, assuming you deposit 10,000 dollars initially and 10% interest, compounded monthly, with no regular deposits.
13. Write the appropriate equation and find the expected value after 2 years, assuming you deposit 10,000 dollars initially and 10.5% interest, compounded quarterly, with a regular deposit of 1000 per quarter.
14. For the difference equation $y_{n+1} = -3y_n + 4$, $y_0 = 1$, determine if it is
 - Constant
 - Monotonic
 - Oscillating
 - Bounded
 - Unbounded
15. For the difference equation $y_{n+1} = -\frac{1}{2}y_n - 8$, $y_0 = 3$, determine if it is
 - Constant

Monotonic
Oscillating
Bounded
Unbounded

16. For the difference equation $y_{n+1} = 5y_n + 2$, $y_0 = 0$, determine if it is

Constant
Monotonic
Oscillating
Bounded
Unbounded

17. For the difference equation $y_{n+1} = \frac{3}{4}y_n + 5$, $y_0 = 10$, determine if it is

Constant
Monotonic
Oscillating
Bounded
Unbounded

18. How much money can you borrow at 12% interest, compounded monthly, if the loan is to be paid off in exactly 10 years with a payment of 660 per month?

19. If you borrow 10,000 dollars at 10% interest, compounded monthly, and want to pay the loan off in 20 years, how much will you have to pay every month?

20. If you were to borrow 10,000 dollars at 10% interest, compounded monthly, and want to pay off the loan eventually, how much should you have to pay every month?

21. Given $f(x) = x^2 + 1$, Find the average rate of change of $f(x)$ as x moves from 1 to 3.

22. Given $f(x) = 2x^2 + x$, Find the average rate of change of $f(x)$ as x moves from -1 to 1.

23. Given $f(x)$ as defined above, find the slope of the secant line as x moves from -1 to 1.

24. Given $f(x) = x^2 + 2x + 1$, find $f'(x)$.

25. Given $f(x) = \sqrt{x} + 1$, find $f'(x)$.

26. Given $f(x) = \sqrt{5} + \pi$, find $f'(x)$.

27. Compute $\frac{d}{dx}(x + \frac{1}{x})$.

28. Compute $\frac{d}{dx}(\frac{1}{\sqrt{x}})$.

29. For $f(x) = x^2 + 9$, find $f'(2)$.

30. Given $f(x)$ as defined above, compute the equation of the tangent line at $x = 2$.

31. Given $f(x) = Ax^2 + Bx + C$, find $f'(x)$. For what value(s) of x is $f'(x) = 0$?