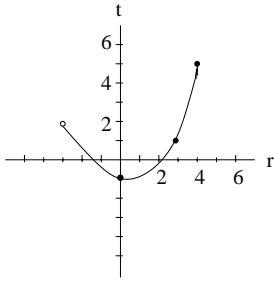


# Review for EXAM # 1

MATH 142

Drost-Fall 2006

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- What is the independent variable?
  - What is the domain?
  - What is the range?
  - What is  $f(3)$ ?
- Find the domain of  $f(x) = \frac{\sqrt{9-3x}}{x^2-5}$  and write your answer in inequality notation.

3. Find the domain of  $g(x) = \frac{2x^2 + x - 3}{3x^2 - x - 2}$  and write your answer in interval form.

4. Find the average rate of change between the points  $(8, -2)$  and  $(-5, 4)$ .

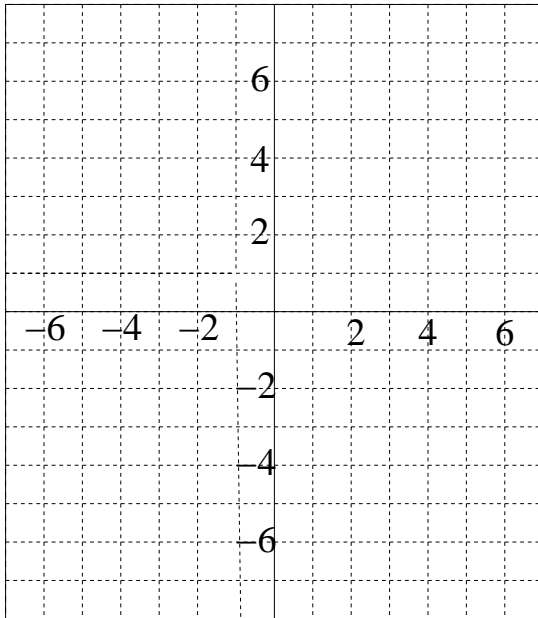
5. Determine the x- and y-intercepts for the graph of  $f(x) = \frac{75 - 10x}{5 - x}$ .

6. Given  $f(x) = 2x - 3x^2$ , use the difference quotient to determine the slope of the secant line where  $x = -2$  and  $\Delta x = 3$ .

7. Given  $f(x) = \sqrt{x}$ ,  $g(x) = x + 4$ . Find  $(f \circ g)(x)$  and its domain.

8. Given  $f(x) = \frac{x^2}{2x + 5}$

- a. Find the intercepts
- b. Find any horizontal asymptotes.
- c. Find any vertical asymptotes.
- d. Graph



9. Rewrite the radical function  $f(x) = \sqrt[4]{(x^2 - 4)^3}$  in exponential form and state the domain.

10. Classify the functions below as exponential growth or decay:

$$f(x) = \left(\frac{2}{5}\right)^x$$

$$g(x) = \left(\frac{3}{2}\right)^{-x}$$

$$h(x) = e^{0.7x}$$

11. Kyle deposits \$2400 into an account that pays interest at a rate of 6.25% compounded weekly.

a. How long before the account reaches \$4,000?

b. How much is in the account after 3 years?

12. J.J. deposits \$1500 into an account paying  $6\frac{3}{4}\%$  compounded continuously.

a. How long before the balance is \$2500?

b. What is the balance after 2 years?

13. Given  $f(x) = 2.5e^{0.02x}$  where  $x$  is the time in minutes and  $f(x)$  is the number of bacteria in the culture in thousands. Find the number of bacteria in the culture after 2 hrs, rounded to the nearest hundred.

14. Rewrite in logarithmic form:

a.  $10^x = 2.4$

b.  $5^{x+1} = 3$

c.  $e^{x^2} = 14$

15. Given  $\log_b 2 = -3$ , and  $\log_b 5 = 4$ , evaluate  $\log_b 20b^3$

16. Given  $f(x) = \frac{2100}{1 + 20e^{-.2x}}$

- a. What is the initial population?
- b. What is the upper limiting population?

17. Given the following data for the average cost of a new home in thousands of dollars, let

$x$  represent the year 1960.

Year	1965	1968	1975	1980	1985	1990	1995
Cost	21.5	26.6	40.1	75.5	110.2	145.6	176.2

- a. Find the best fitting model, using quadratic, cubic or logistic, and explain why you think this is the best model.
- b. Using this model, predict the average cost in 2003.
18. An item sells for \$9. If the fixed costs are \$600 and the total costs are \$2000 when 200 items are made and sold, find the cost equation.
19. Find the profit when 400 items are made and sold. (See #18)

20. Find the best fitting curve between exponential and cubic regression for the following table of data, where  $x$  = number of years since 1980, and  $y$  = number of cases of meningitis in Houston.

Year	'82	'85	'88	'90	'97
Popul	8	12	25	30	56

21.  $y^2 + 3x = 5$ , does this equation describe a function?

22. Find the difference quotient for:

$$f(x) = x^2 + 5x - 10$$

23. Solve  $\log_7(\log(\ln x)) = 1$

24. Given  $\log x = 8$  and  $\log y = 12$ , evaluate:  $\log x^2y$

25. Solve:  $5 \cdot 3^{2x-1} = 2$

26. Solve:  $\log_8 (x - 3) = 2$

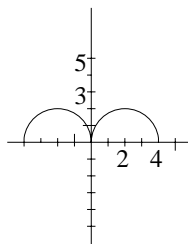
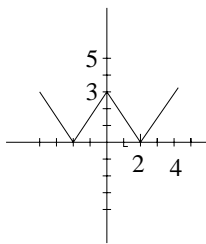
27. Solve:  $\log_2 x + \log_2 (x - 7) = 3$

28. If planted with 100 trees, each tree produces \$50 per year. Due to overcrowding, for each additional tree planted the yield drops 50 cents. How many trees should be planted to maximize the revenue?

If the cost to care for the trees (fertilizer and water) run \$15 per year per tree, how many trees should be planted to maximize profit?

29. Find the domain of  $f(x) = \frac{2x^2 + 7x - 15}{x + 5}$

30. Given the graphs of  $f(x)$  and  $g(x)$  below, show the graph of  $f(x-3)+2$  and  $-g(x+1)-5$



31. Which of the following are polynomials?

a)  $f(x) = 3x^2 - \frac{5}{x} + 6$

b)  $g(x) = 3\sqrt{x} + 2$

c)  $h(x) = e^x$

d)  $F(x) = 5x^3 - \frac{3}{x^{-4}}$

32. Given the logistic model:  $y = \frac{28}{1 + 6e^{-.001x}}$ .

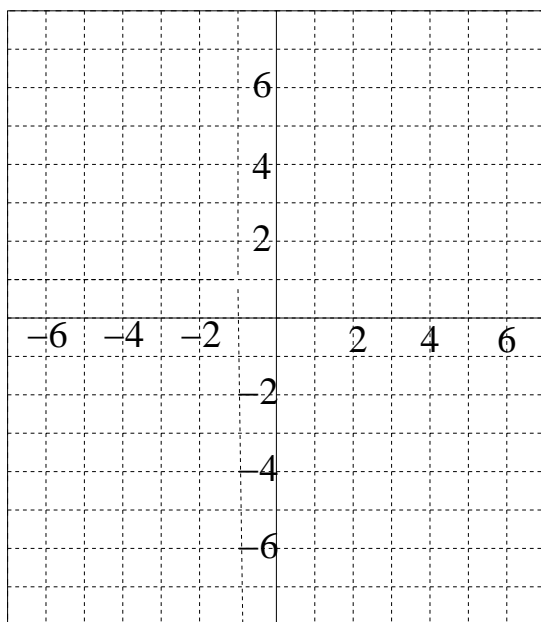
a) what is the limiting value?

b) what is the initial value?

33. How long does it take for an account earning  $10\frac{3}{4}\%$  compounded quarterly to double?

34. Graph the piecewise defined function

$$f(x) = \begin{cases} |x - 2|, & \text{if } x < -2 \\ 5, & \text{if } -2 \leq x \leq 1 \\ x^2 + 1 & \text{if } x > 2 \end{cases}$$



35. A machine purchased for \$1800 has a useful life of 6 years and a scrap value of \$500. Assuming a straight line depreciation, find its value at 4 years old.

36. Solve:  $25^{3x} = 125^{x-4}$