

Week in Review # 2

MATH 142

2.5, 3.1, 3.2, Algebra Review

Drost-Spring 2010

2.5 Logarithmic Functions

1. Rewrite in logarithmic form:

a. $5^{-2} = .04$

b. $e^0 = 1$

c. $10^3 = 1000$

2. Solve each of the following equations. Find

(i) the exact answer, and

(ii) an approximate solution rounded to four decimal places.

a. $6 \cdot 9^x = 126$

b. $5 \cdot 3^{x+1} = 200$

c. $2e^x + 4 = 52$

3. Using the rules of logarithms, rewrite without any products, quotients, or powers:

$$\log \frac{100x^3}{y^2z^5}$$

4. Solve for x : $\frac{3}{2} \ln 4 + \frac{2}{3} \ln 8 - 2 \ln 2 = \frac{1}{2} \ln x$

5. Evaluate given: $\log_b(A) = x$, $\log_b(B) = y$, and $\log_b(C) = 3$,

$$\log_b \left\{ \frac{A\sqrt{B}}{C^2} \right\}$$

6. Solve: $\log_9 = \frac{1}{2}$

7. Simplify: $\frac{\log_5 400}{\log_5 20}$

8. Solve: $e^{2x} = 5$. Round your answer to four decimal places.

9. How long before an investment triples in value, when invested in a fund paying 6.5% compounded monthly?

3.1 Introduction to Limits

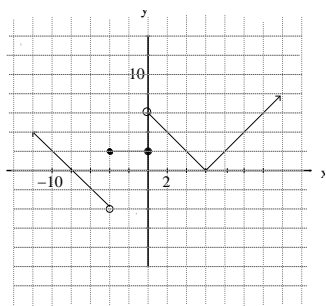
10. Evaluate: $\lim_{x \rightarrow 3} \frac{2x^2 - 7x + 3}{x^2 + x - 12}$

11. Evaluate: $\lim_{x \rightarrow 5} \frac{3x + 5}{x - 1}$

12. Evaluate: $\lim_{x \rightarrow 2} f(x)$ where

$$f(x) = \begin{cases} 2(x + 1)^2, & x < 2 \\ 10x - 2, & x > 2 \end{cases}$$

13. Determine each of the following from the graph of $f(x)$ above:



a. $\lim_{x \rightarrow -4^+} f(x)$

b. $\lim_{x \rightarrow -4^-} f(x)$

c. $\lim_{x \rightarrow -4} f(x)$

14. Find $\lim_{x \rightarrow 8} (x^2 - 4x + 5)$.

15. Find $\lim_{x \rightarrow -1} \sqrt{-2x^2 + 4x + 10}$

16. Evaluate: $\lim_{x \rightarrow 4} \frac{x^2 + 4}{x + 1}$

17. Evaluate: $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$

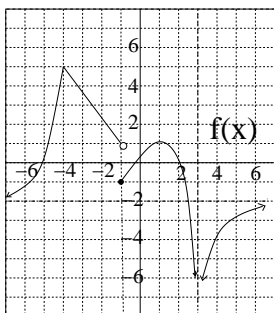
18. Evaluate: $\lim_{x \rightarrow 2^-} \frac{|x - 2|}{x - 2}$

3.2 Continuity

19. Find the intervals over which $f(x)$ is continuous where

$$f(x) = \begin{cases} \frac{x^2 + 3x - 4}{x^2 - 6x + 5}, & x < 2 \\ \frac{x^2 + 3x - 40}{x^2 - 5x}, & x \geq 2 \end{cases}$$

20. Determine the values of x for which the function graphed below is discontinuous:



21. Determine whether the function is continuous at the given value of x .

a. $f(x) = \frac{|x|}{x}$ at $x = 0$.

b. $g(x) = \frac{x^2 - 16}{x^2 - 7x + 12}$ at $x = 4, x = 3$.

22. Determine the intervals over which each function is continuous:

a. $f(x) = \sqrt{2x - 10}$

b. $g(x) = \sqrt[3]{x^2 - x + 12}$

c. $h(x) = x^2 - 3x + 2$

23. Solve $\frac{x-4}{x+2} \leq 0$

24. Determine which of the following functions are 1-1.

a. $f(x) = x^2 - 4x + 4$

b. $g(x) = \sqrt{2x-10}$

c. $h(x) = -|x-5| + 2$

d. $C(x) = x^3 - 2$

e. $P(x) = \ln(2x-5)$

f. $R(x) = e^{0.02x-1}$

Algebra Review

25. Find $\frac{f(x+h) - f(x)}{h}$, known as the **difference quotient**, for each of the following functions.

a. $f(x) = 2x^2 - 3x + 5$

b. $f(x) = \frac{x}{x+2}$

c. $f(x) = \sqrt{2x-5}$

26. For each function in problem #24, find

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

27. Write a function, $S(x)$, to represent the salesman's monthly salary if he earns a base salary of \$1000/month plus 8% of sales over \$20,000, and 15% of sales over \$50,000, where x represents the total sales each month in dollars.