

MTH 32 LECTURE NOTES (Ojakian)

Topic 5: Exponentials and Logarithms

OUTLINE (References: 2.7)

1. Functions
 2. One-to-one functions
 3. Inverse of a function
 4. Exponential and Logarithm
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1. Functions and one-to-one functions

PROBLEM 1. Do WORK BOOK section 6: 1, 2, 3, 4, 14abcde

2. Inverse Functions

PROBLEM 2. Do WORK BOOK section 6: 7

PROBLEM 3. Find the inverse of the function $f(x) = 3x + 4$, by intuition. Check answer, doing WORK BOOK section 6: #8.

3. Special Example: Exponential vs. Logarithm

PROBLEM 4. Note how $f(x) = e^x$ and $g(x) = \ln(x)$ are inverses via picture and cancellation.

4. Formal Development of Logarithm

Question: Natural log as response to - antiderivative of $1/x$. Recall Fundamental Theorem of Calculus.

PROBLEM 5. Note some basic properties of \ln that follow from the definition.

- (a) Its derivative.
- (b) $\ln(1) = ??$
- (c) $\ln(x^r) = r \ln(x)$

PROBLEM 6. Do Textbook, Section 2.7 (Page 230): 296, 312

5. Formal Development of Exponential

PROBLEM 7. Let $F(x) = e^x$ and note that it basically satisfies inverse cancellation with \ln IF we define e how??

PROBLEM 8. Check how some properties of e^x follow from the definition.

- (a) Exponent sum rule.
- (b) Its derivative.

PROBLEM 9.

- (a) Do Textbook, Section 2.7 (Page 230): 322.
- (b) Evaluate $\int xe^{x^2} dx$