

Exam IV Study Aid

Exam IV : Sections 4.1-4.5 & Exponential and
Logarithmic Applications Worksheet

Friday, April 27th (In Class)

Our fourth (and last) in-class exam will cover only the material from sections: 4.1-4.5, as well as the Exponential and Logarithmic Applications Worksheet. You will have the entire class period (50 minutes) to complete the exam (you may leave once you are finished).

Below is a list of the main concepts or definitions you should definitely know and be comfortable with. (Note: this list is not a comprehensive list of all the topics we have learned in Sections 4.1-4.5, it is simply a list of the very important topics. Hence, as a warning, there may be topics on the exam which are not listed below – i.e. don't simply study this list and nothing else!)

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|---|--------------------------------------|
| 1. Domain of Exponential Functions | 14. Determining Inverse Functions |
| 2. Graphs of Exponential Functions | 15. Logarithms |
| 3. Compound Interest Formula | 16. Logarithmic Functions |
| 4. Half-Life & Doubling Time Formulas | 17. Domain of Logarithmic Functions |
| 5. The Number e | 18. The Natural & Common Logarithm |
| 6. The Natural Exponential Function | 19. Graphs of Logarithmic Functions |
| 7. Continuous Compound Interest Formula | 20. Properties of Logarithms |
| 8. Exponential Growth/Decay Model | 21. Expanding/Simplifying Logarithms |
| 9. Newton's Law of Cooling | 22. Logarithm Identities |
| 10. Requirements for Inverse Functions | 23. Change-of-Base Formula |
| 11. Graphs of Inverse Functions | 24. Solving Exponential Equations |
| 12. One-to-One Functions | 25. Solving Logarithmic Equations |
| 13. Horizontal Line Test | |

Finally, here is a list of good practice problems that might help you in studying. All of the problems were picked to be odd numbered so that their solutions would be found in the back of the book.

- Section 4.1 – 3, 5, 7, 15, 19, 23, 25, 27, 31, 33, 35, 37, 39
- Section 4.2 – 1, 3, 5, 13, 19, 21, 37, 43, 45
- Section 4.3 – 1, 3, 5, 7, 9, 13, 17, 19, 21, 23, 31
- Section 4.4 – 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 59
- Section 4.5 – 1, 3, 13, 15, 17, 19, 21, 23, 25, 27, 31, 37, 41, 43, 45, 57

Supplemental Problems:

1. Find the equation of the exponential function passing through the points $(1, 10)$ and $(-2, \frac{1}{18})$. (Hint: The equation will be of the form $f(x) = c \cdot b^x$ for some real numbers b, c .)
2. After decreasing for years, the number of California gray whales is now growing. Their population can be approximated by the exponential growth model $A = Pe^{rt}$, where $r = 0.015$ when t is measured in years. If $t = 0$ corresponds to the year 2004, estimate the population in 2012, as a percentage of the population in 2004.
3. How many years must pass for \$2,500 to grow into \$6,000 if it is in an account paying 9% annual interest compounded continuously? (Round your answer to the nearest year.)
4. Which one of the following tables does not represent a one-to-one function?

(a.)

x	$f(x)$
-2	-2
-1	-1
0	0
1	1
2	2

(b.)

x	$f(x)$
2	0
3	1
4	2
5	3
6	-5

(c.)

x	$f(x)$
4	-1
-1	4
-3	π
10	0
8	-2

(d.)

x	$f(x)$
-5	0
-4	2
-3	1
-2	0
-1	-4

(e.)

x	$f(x)$
$\frac{3}{4}$	$-\frac{2}{3}$
$\frac{1}{4}$	$\frac{6}{5}$
0	0
$-\frac{1}{4}$	3
-1	$\frac{2}{3}$

Solutions to Supplemental Problems:

1. $f(x) = 2 \cdot 6^x$
2. About 112.75%
3. 10 years
4. (d.)