KILROY ACADEMY

A MARINE SCIENTIST'S GUIDE TO LOGARITHMS

ANSWER KEY

VIDEO

1. Linear; Log
2. Pressure increases with depth. For each 100 feet under water, the pressure increases by 44 pounds per square inch.
3. Linear
4. Addition
5. Light underwater is measured as a percentage of the light at the surface. This is impacted by the amount of sunlight at the surface and cloud cover. The clarity of water also impacts how far the light travels under water.
6. Multiplication
7. Logarithms
8. Calculating number
9. 10
10. Very large; very small; 1
11. Exponent; inverse
12. The logarithm of a number to the base 10 is the power to which 10 must be raised to get that number. This can be written as $\log_{10} y = x$ or $10^x = y$.
13. Orders of Magnitude
14. A log scale compresses a large range of values into a more manageable form.

EXAMPLES

*Note: When base is not written, it is assumed to be 10.

$10^x = 1{,}000{,}000$ $10^x = \frac{1}{10^7}$ $10^x = 10$

X = 6 x = -7 x = 1

1. $10^x = \frac{1}{10}$; x = -1
2. $10^x = 10^4$; x = 4
3. $10^x = \frac{1}{1{,}000{,}000{,}000}$; x = -9
4. $10^x = 10{,}000$; x = 4
5. $10^x = \frac{1}{1000}$; x = -3
6. $10^x = 10^{-35}$; x = -35
7. You would still apply the definition to find the power of 2 that equals the number in the logarithm. For instance, $\log_2 8 = x$ would be rewritten as $2^x = 8$ to find that x = 3.

ACKNOWLEDGEMENTS

Thank you to Kathy Nestor and Sandy McMahon, math teachers at Vero Beach High School and Sebastian River High school, respectively, for creating this worksheet key for Kilroy Academy. Special thanks to Indian River Impact 100 for funding Kilroy Academy.

Made possible with funding provided by

INDIAN RIVER IMPACT 100
WOMEN AND PHILANTHROPY MAKING A DIFFERENCE.