**Logarithm**

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## Why learn Logarithm?

* 1. ?

Real-life example:

- pH scale (acidic to alkaline)

- Richter scale (measure earthquake magnitude)

## Introduction

* 1. Expressing a number in index form with base 10
     1. Example 100 = 102
     2. Example 1000 = 103
  2. How about 40 with base 10? What is x?
     1. 40 = 10x

## Definitions

|  |  |
| --- | --- |
| Index Form |  |
| Logarithmic Form |  |

## Change of Base (exercise)

|  |  |
| --- | --- |
|  |  |
|  |  |

1. Index form to Logarithmic Form

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Logarithmic Form to Index form

|  |  |
| --- | --- |
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|  |  |
|  |  |
|  |  |

## Rule

|  |  |
| --- | --- |
| 1 Logarithm Base | Example: |
| 2 Logarithm 1 | Example: |
| 3 Logarithm Product Rule Note: | Example 1:  Example 1 Solve:  Example 2:  Example 3:  Example 4:  Example 5: |
| 4 Logarithm Quotient Rule Note: | Example 1:  Example 2:  Example 3:  Example 4:  Example 5: |
| 5 Logarithm Power Rule | Prove:  Example 1:  Example 2: |
| Logarithm Base Switch Rule |  |
| Logarithm Base Change Rule |  |
| Logarithm 0 |  |
| Logarithm Negative |  |
| 6 common Logarithm |  |
| 7 Natural Logarithm |  |

## Exercise – Evaluate the following

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

## Exercise – Solve

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |

## Exercise – Exponential Equations

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |

## Exercise – Solving Unknown

|  |  |
| --- | --- |
| 1 |  |

## Exercise – Logarithm Equations

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |

|  |  |
| --- | --- |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |

|  |  |
| --- | --- |
| 9 |  |

## Exercise – Logarithm Change of base

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |

|  |  |
| --- | --- |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |

|  |  |
| --- | --- |
| 8 |  |
| 9 |  |