Section 7-5 Logarithmic Functions

Warm up:

Find the patterns in the data and what type of function it is:

| x | f(x) |
|---|---|
| 1 | 4 |
| 3 | 7 |
| 5 | 10 |
| 7 | 13 |
| 9 | 16 |

| x | f(x) |
|---|---|
| 1 | 15 |
| 3 | 45 |
| 5 | 135 |
| 7 | 405 |
| 9 | 1215 |

| x | f(x) |
|---|---|
| 2 | 5 |
| 4 | 25 |
| 8 | 125 |
| 16 | 625 |
| 32 | 3125 |

| x | f(x) |
|---|---|
| 4 | 5 |
| 5 | 7 |
| 6 | 11 |
| 7 | 17 |
| 8 | 25 |

Exponential function

$y = a \cdot b^x$

add-multiply

| x | f(x) |
|---|---|
| 10 | 200 |
| 12 | 300 |
| 14 | 450 |
| 16 | 675 |

**Logarithm Function**

$y = a + b \log_c x$ **or** $y = a + b \ln x$

multiply-add

| x | f(x) |
|---|---|
| 200 | 10 |
| 300 | 12 |
| 450 | 14 |
| 675 | 16 |

Use the first and last points to find algebraically the particular equation of the natural logarithmic function that fits the points.

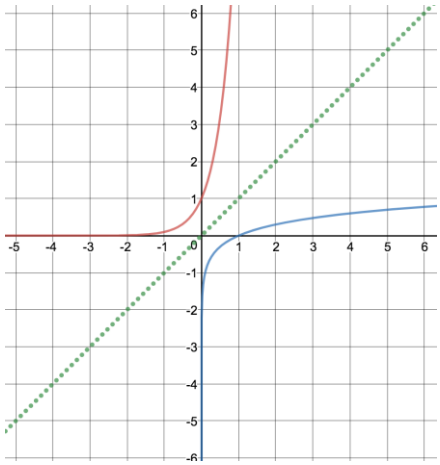
1.

| x | f(x) |
|---|---|
| 200 | 10 |
| 300 | 12 |
| 450 | 14 |
| 675 | 16 |

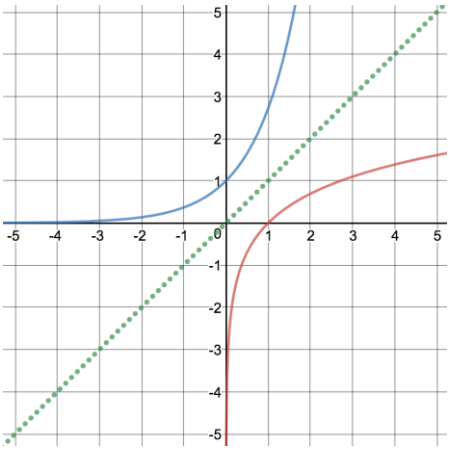
2.

| x | f(x) |
|---|---|
| 1 | 2 |
| 10 | 3 |
| 100 | 4 |
| 1000 | 5 |

**y = log x**
**Domain: x > 0**



**y = ln x**
**Domain: x > 0**



**Graph:**

**Domain:**

$$f(x) = 5\log(x+4)$$

$$g(x) = \ln(7x-1)$$

$$h(x) = \log_8(x^2-4)$$

$$p(x) = 6\log(2-x)$$

$$q(x) = 4 - \ln x$$

$$m(x) = -3 + \log x$$