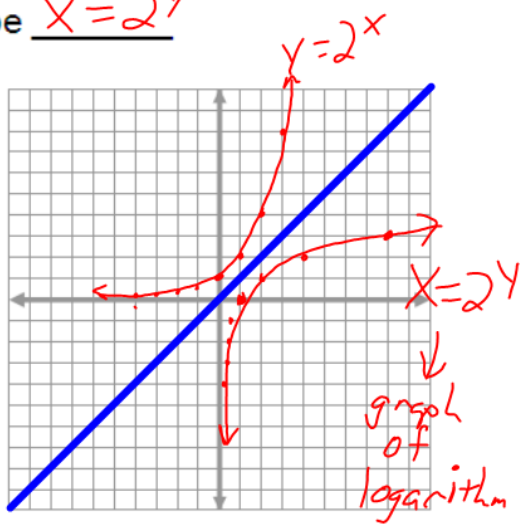
For the equation $y = 2^x$, the inverse would be $x = 2^y$

$y = 2^x$

x	y
-4	$\frac{1}{16}$
-3	$\frac{1}{8}$
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8
4	16

$x = 2^y$

x	y
$\frac{1}{16}$	-4
$\frac{1}{8}$	-3
$\frac{1}{4}$	-2
$\frac{1}{2}$	-1
1	0
2	1
4	2
8	3
16	4



To convert from exponential form to logarithmic form and vice versa:

Exponential form

$x = b^y$ → exponent

↓ base

Logarithmic form → log

$\log_b x = y$

log base b of x equals y

log of x with base b

Conv. log → exp

$\log_b x = y$ $\quad b^y = x$

1. $\log_8 1 = 0$

$8^0 = 1$

2. $\log_2 \frac{1}{16} = -4$

$2^{-4} = \frac{1}{16}$

$\frac{1}{2^4}$

3. $\log_4 16 = 2$

$4^2 = 16$

4. $\log_3 \frac{1}{27} = -3$

$3^{-3} = \frac{1}{27}$

5. $10^3 = 1000$

$\log_{10} 1000 = 3$

6. $9^{\frac{1}{2}} = 3$

$\log_9 3 = \frac{1}{2}$

7. $4^3 = 64$

$\log_4 64 = 3$

8. $125^{\frac{1}{3}} = 5$

$\log_{125} 5 = \frac{1}{3}$

9. $\log_2 64 = 6$

$2^x = 64 = 2^6$

$2^x = 2^6$

$x = 6$

10. $\log_3 81 = 4$

$3^h = 81 = 3^4$

$3^h = 3^4$

12. $\log_4 x = \frac{5}{2}$

$4^{\frac{5}{2}} = x$

$\sqrt{4^5} = x$

$32 = x$

13. $\log_9 x = \frac{3}{2}$

$9^{\frac{3}{2}} = x$

$\sqrt{9^3} = x$

$27 = x$

14 $\log_n 216 = 3$

$\sqrt[3]{n^3} = \sqrt[3]{216}$

$n = 6$

Property of Equality for Logarithmic Functions

If $\log_7 x = \log_7 3$, then $x = 3$

15. $\log_5(3x+4) = \log_5(7x-8)$

$3x+4 = 7x-8$

$4 = 4x-8$

$12 = 4x$

$3 = x$

16. $\log_3 50 = \log_3(6x-4)$

$50 = 6x-4$

$54 = 6x$

$9 = x$

Property of Inequality for Logarithmic Functions

If $\log_7 x > \log_7 3$, then $x > 3$

Solve equations with logarithms on each side

17. $\log_6(2x-9) \le \log_6(4x+3)$

$2x-9 \le 4x+3$

$-2x-9 \le 3$

$-2x \le 12$

$x \ge -6$ or $-6 \le x$