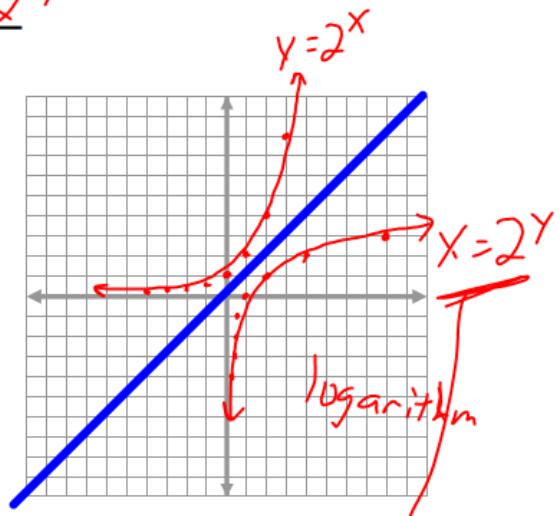
For the equation $y = 2^x$, the inverse would be $x = 2^y$

$y = 2^x$

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

$\log_b x = y$ → exponent

base

log base b of x equals y

log of x with base b

Conv. to exp. form $x = b^y$

1. $\log_8 1 = 0$

$\log_b x = y$

$1 = 8^0$

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

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

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

3. $\log_4 16 = 2$

$16 = 4^2$

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

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

Conv. exp → log

5. $10^3 = 1000$

$\log_{10} 1000 = 3$

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

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

Conv. to log

7. $4^3 = 64$

$\log_4 64 = 3$

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

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

Evaluate

9. $\log_2 64 = x$

$2^6 = 64 = 2^x$

$2^6 = 2^x$

$6 = x$

$2^2 = 4$
$2^3 = 8$
$2^4 = 16$
$2^5 = 32$
$2^6 = 64$

10. $\log_3 81 = r$

$3^r = 81 = 3^4$

$r = 4$

11. $\log_4 256 = z$

$4^z = 256 = 4^4$

$z = 4$

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

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

$x = \sqrt{4^5}$

$x = 32$

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

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

$x = \sqrt{9^3}$

$x = 27$

14 $\log_n 216 = 3$

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

$6 = n$

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 $x > 3$

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

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

$-9 \le 2x+3$

$-12 \le 2x$

$-6 \le x$ OR $x \ge -6$