

Day 2 – Solving Exponential Inequalities

Solve Exponential Inequalities An **exponential inequality** is an inequality involving exponential functions.

Property of Inequality for Exponential Functions	If $b > 1$ then $b^x > b^y$ if and only if $x > y$ and $b^x < b^y$ if and only if $x < y$.
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Example Solve $5^{2x-1} > \frac{1}{125}$.

$5^{2x-1} > \frac{1}{125}$	Original inequality
$5^{2x-1} > 5^{-3}$	Rewrite $\frac{1}{125}$ as 5^{-3} .
$2x - 1 > -3$	Prop. of Inequality for Exponential Functions
$2x > -2$	Add 1 to each side.
$x > -1$	Divide each side by 2.

		Powers		
		2	3	4
Bases	0	0	0	0
	1	1	1	1
	2	4	8	16
	3	9	27	81
	4	16	64	256
	5	25	125	625
	6	36	216	1296
	7	49	343	2401
	8	64	512	4096
	9	81	729	6561
	10	100	1000	10000

EXPONENTIAL INEQUALITIES: * Remember, when solving inequalities you need to flip the inequality sign when dividing or multiplying by a negative number. You also need to check your solutions to make sure they make sense.

Examples

a. $25^{2x+3} > 25^{5x-9}$

b. $16 \geq 4^{x+5}$

c. $7^{3x} < 49^{1-x}$

d. $5^{2x} < 125^{x-5}$

e. $10^{4x+1} > 100^{x-2}$

f. $27^{x-2} \leq 81^{x+7}$

g. $\frac{1}{81} < 9^{2x-4}$

h. $\left(\frac{1}{9}\right)^{2x+7} \leq 27^{6x-12}$

i. $\left(\frac{1}{36}\right)^{6x-3} > 6^{3x-9}$