

# Inequalities Radical

MATH by Wilson  
Your Personal Mathematics Trainer  
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We are looking for the numbers on the horizontal number line (x-axis) that make the inequality true.

**Question 01:** Solve for x:  $\sqrt{3-4x} \geq 0$

**Solution:**

**Note:**  $u < 0 \Leftrightarrow \sqrt{u}$  are complex       $u > 0 \Leftrightarrow \sqrt{u}$  are real

Step	Inequality	Reason
0	$\sqrt{3-4x} \geq 0$	$\Rightarrow 3x - 4 \geq 0$
1	$3 - 4x \geq 0$	
2	$3 \geq 4x$	
3	$\frac{3}{4} \geq x$ $\left( \text{or } x \leq \frac{3}{4} \right)$	

Graph of solution set:

**Question 02:** Solve for x:  $\sqrt{3-4x} \leq 0$

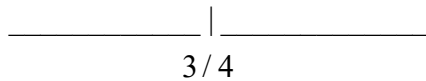
**Solution:**

**Note:**  $u < 0 \Leftrightarrow \sqrt{u}$  are complex       $u > 0 \Leftrightarrow \sqrt{u}$  are real

$\sqrt{0} = 0$

Step	Inequality	Reason
0	$\sqrt{3-4x} \leq 0$	$\Rightarrow 3-4x = 0$
1	$3 = 4x$	
2	$\frac{3}{4} = x$ (or $x = \frac{3}{4}$ )	

Graph of solution set:

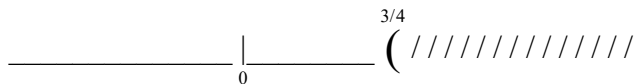


**Question 03:** Solve for x:  $\sqrt[3]{3-4x} < 0$

**Solution:**

Step	Inequality	Reason
0	$\sqrt[3]{3-4x} < 0$	$\Rightarrow 3-4x < 0$
1	$3-4x < 0$	
2	$3 < 4x$	
3	$\frac{3}{4} < x$ (or $x > \frac{3}{4}$ )	

Graph of solution set:



**Question 04:** Solve for  $x$ :  $\sqrt{6-x-x^2} > 0$

**Solution:**

Step	Inequality	Reason
0	$\sqrt{6-x-x^2} > 0$	$\Rightarrow 6-x-x^2 > 0$
1	$6-x-x^2 > 0$	
2	$(3+x)(2-x) > 0$	
3	Determine Boundary Points: $(3+x)(2-x) = 0$ $x = -3$ ; $x = 2$	
4	Check Boundary Points: 1. $x = -3$ : $(3+[-3])(2-[-3]) \stackrel{?}{>} 0$ $(0)(5) \stackrel{?}{>} 0$ $0 > 0$ False; $-3$ is NOT in the solution set 2. $x = 2$ : $(3+[2])(2-[2]) \stackrel{?}{>} 0$ $(5)(0) \stackrel{?}{>} 0$ $0 > 0$ False; $2$ is NOT in the solution set	
5	Check Intervals: 1. $(-\infty, -3)$ : Test Point $x = -6$ : $(3+[-6])(2-[-6]) \stackrel{?}{>} 0$ $(-3)(8) \stackrel{?}{>} 0$ $-24 > 0$ False; $(-\infty, -3)$ is NOT in the solution set 2. $(-3, 2)$ : Test Point $x = 0$ : $(3+[0])(2-[0]) \stackrel{?}{>} 0$ $(3)(2) \stackrel{?}{>} 0$ $6 > 0$ True; $(-3, 2)$ is in the solution set 3. $(2, +\infty)$ : Test Point $x = 10$ : $(3+[10])(2-[10]) \stackrel{?}{>} 0$ $(13)(-8) \stackrel{?}{>} 0$ $-104 > 0$ False; $(2, +\infty)$ is NOT in the solution set	
6	Solution Set: $(-3, 2)$	

Graph of the solution set:

