

Algebra 2 1.5 Solve equations and inequalities by graphing.

Obj: Use graphs and tables to approximate solutions to algebraic equations and inequalities.

What is a solution to an equation? *the value(s) that make it true.*

A solution of an equation is a number or numbers that when substituted for the variable in the equation produces a true statement.

What value makes this true? $x^2 - 4 = 0$ $x = 2$ or $x = -2$

Graphical solutions to equations provide an approximate solution when algebraic methods are not available to find an exact solution.

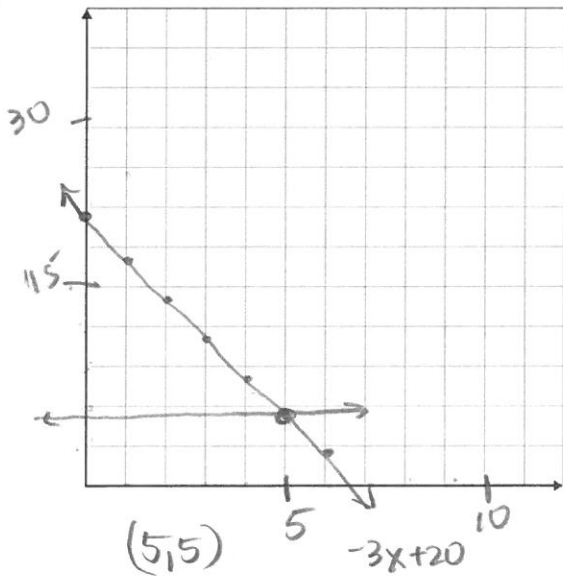
Intersection.

Example 1. Solve by graphing.

Graph each side separately + find intersection

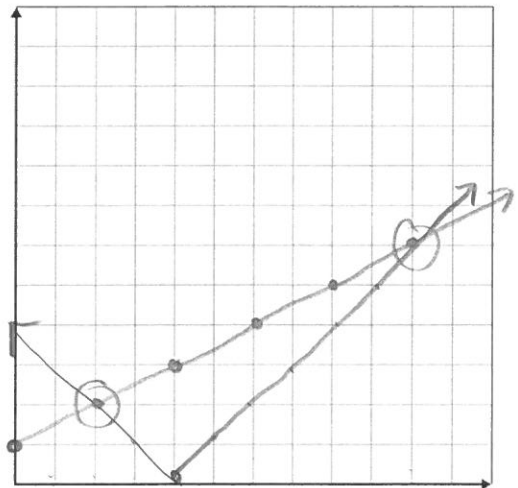
a. y_1 y_2
 $-3x + 20 = 5$

b. $|x - 4| = \frac{1}{2}x + 1$



$x = 5$
 check

$$\begin{aligned} -3(5) + 20 &= 5 \\ -15 + 20 &= 5 \\ &\checkmark \end{aligned}$$



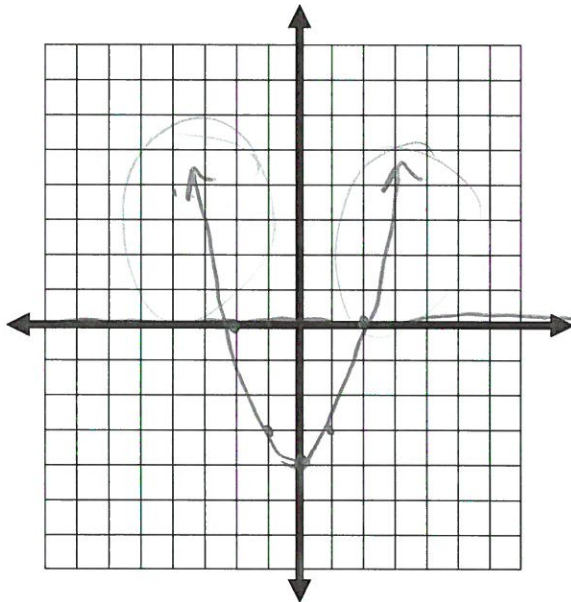
$y = |x - 4|$ at 4 $y = \frac{1}{2}x + 1$
 $x = 2$ $x = 10$

check

$$\begin{aligned} |2 - 4| &= \frac{1}{2}(2) + 1 \\ |-2| &= 1 + 1 \\ 2 &= 2 \checkmark \end{aligned}$$

$$\begin{aligned} |10 - 4| &= \frac{1}{2}(10) + 1 \\ 6 &= 6 \checkmark \end{aligned}$$

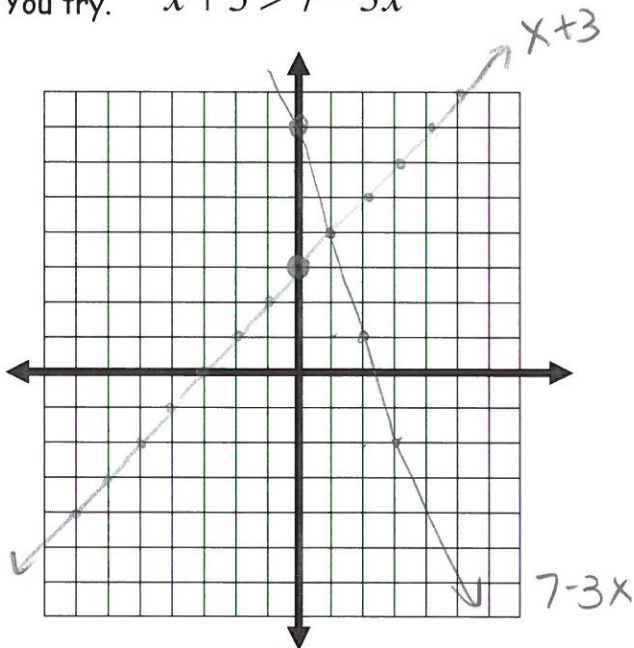
Example 2. Solve an inequality.



$x^2 - 4 > 0$ where is $x^2 - 4$ above 0
 ↓
 parabola
 ↓
 $y = x^2 - 4$ $y = 0$
 $x < -2$ $x > 2$

How would the answer differ if it was < 0
 $x^2 - 4$ below 0
 (-2, 2)

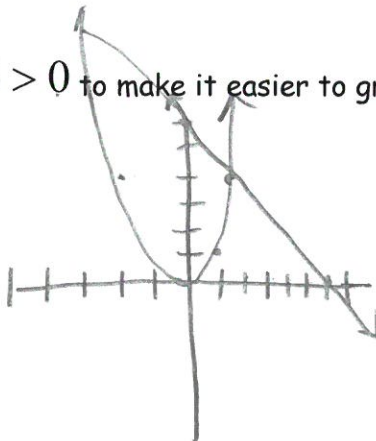
You try. $x + 3 > 7 - 3x$



$x + 3$ above $7 - 3x$
 $x > 1$

* How can you rearrange $x^2 + x - 6 > 0$ to make it easier to graph and solve?

$x^2 > -x + 6$
 parabola line



Using the graphing calculator. skip 3

Example 3. Approximate the solution to the nearest thousandth.

$$-x^2 + 8x - 13 = |x - 4|$$

Steps.

graph $-x^2 + 8x - 13$ in y_1

$|x - 4|$ in y_2

2nd calc #5 intersect
select y_1 enter
select y_2 enter
guess \rightarrow move cursor
to pt, enter

$$x \approx 2.697$$

$$x \approx 5.303$$

★ How would your answer change if the problem was $-x^2 + 8x - 13 > |x - 4|$?

in between

$$(2.697, 5.303)$$

You try.

$$★ x^2 - 5 = 8 - 2x^2$$

$$x = \pm 2.082$$

