Algebra 1 9.2

Solve quadratic equations by graphing

Estimate quadratic solutions by graphing

integer

Solution

Root

x-intercept ← cross x-axis

Double root

standard form

equation

related function

$x = \frac{-b}{2a}$

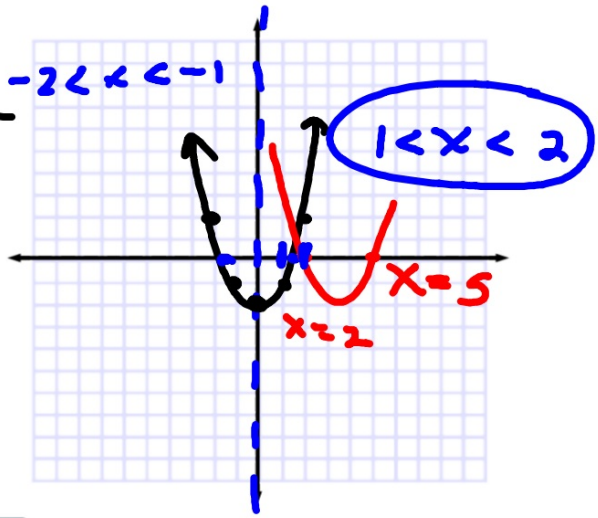
Whiteboards

Where does the graph cross the x-axis?
What is true about the y-coordinate there?

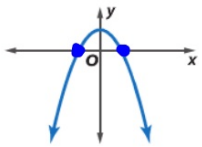
$y = 1x^2 - 2$

	x^2-2	
0	0 −2	−2
1	1 −2	−1
2	4 −2	2

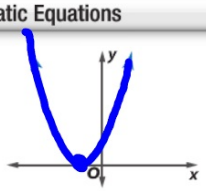
$x = \frac{-b}{2a}$ $\frac{0}{2 \cdot 1} = 0$



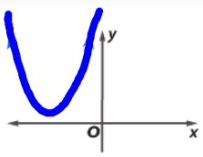
KeyConcept Solutions of Quadratic Equations



two unique real solutions

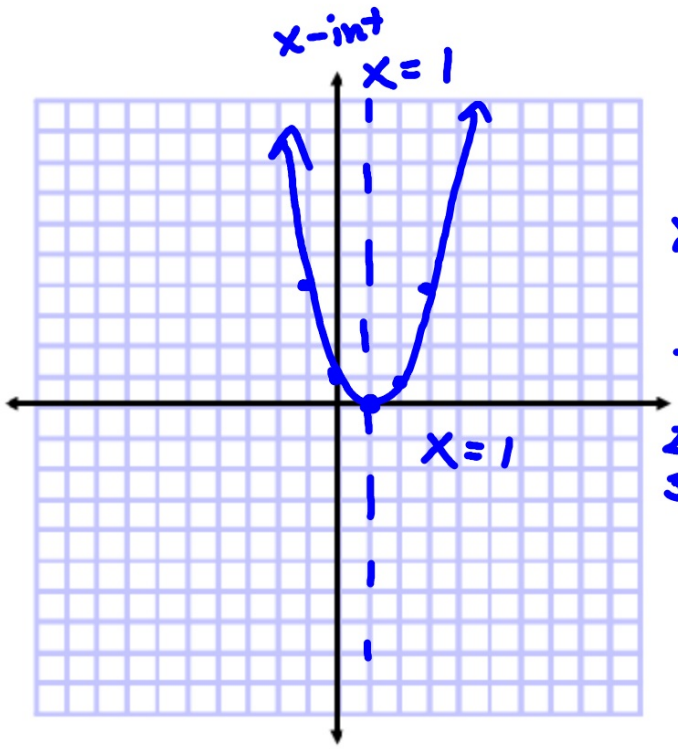


one unique real solution



no real solutions

"double root"



$y = 1x^2 - 2x + 1$

$x = \frac{2}{2 \cdot 1} = 1$

	x^2-2x+1	
1	$1-2+1$	0
2	$4-4+1$	1
3	$9-6+1$	y

GuidedPractice **Solve each equation by graphing.**

$x = \frac{4}{2 \cdot 1} = 2$

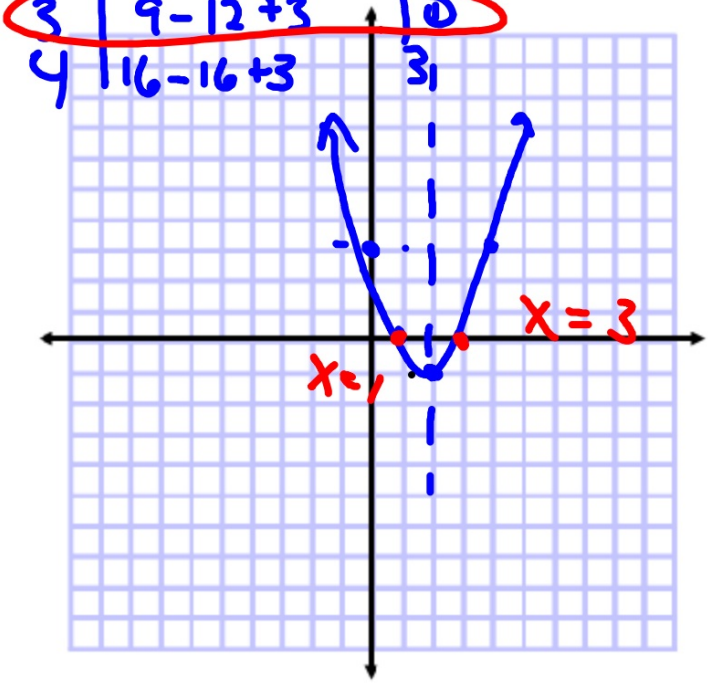
x	$x^2 - 4x + 3$
2	$4 - 8 + 3$
3	$9 - 12 + 3$
4	$16 - 16 + 3$

1B. $x^2 - 4x + 3 = 0$

$y = x^2 - 4x + 3$ $x^2 \cup$ $-x^2 \cap$

Does it open up or down?
Function form (y=)
x=-b/2a etc.
Table of values

Answer the question
Solve: where does it cross x-axis?
hint: y-coordinate there is 0

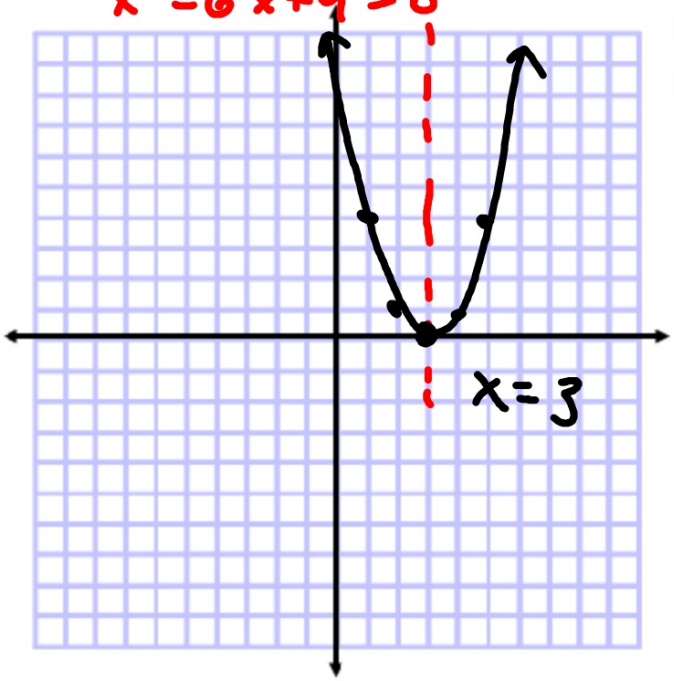


Example 2 Double Root

Solve $x^2 - 6x = -9$ by graphing.

$+9 \quad +9$

$x^2 - 6x + 9 = 0$



Change to =0 (if necessary)
Open up or down?
Use function form (y=) for graphing
Answer the question
If your graph is inaccurate...

$y = x^2 - 6x + 9$

$x = \frac{6}{2 \cdot 1} = 3$

	x^2-6x+9	
3	$9-18+9$	0
4	$16-24+9$	1
5	$25-30+9$	y

Rearrange (if necessary)
Change to function form

GuidedPractice

Solve each equation by graphing.

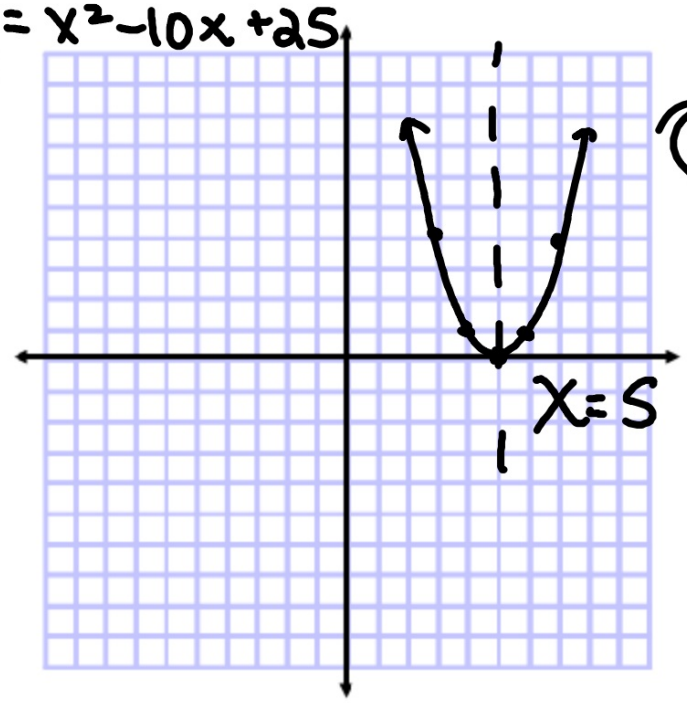
2A. $x^2 + 25 = 10x$

$-10x \quad -10x$

$X = \frac{10}{2} = 5$

2B. $x^2 = -8x - 16$

$y = x^2 - 10x + 25$

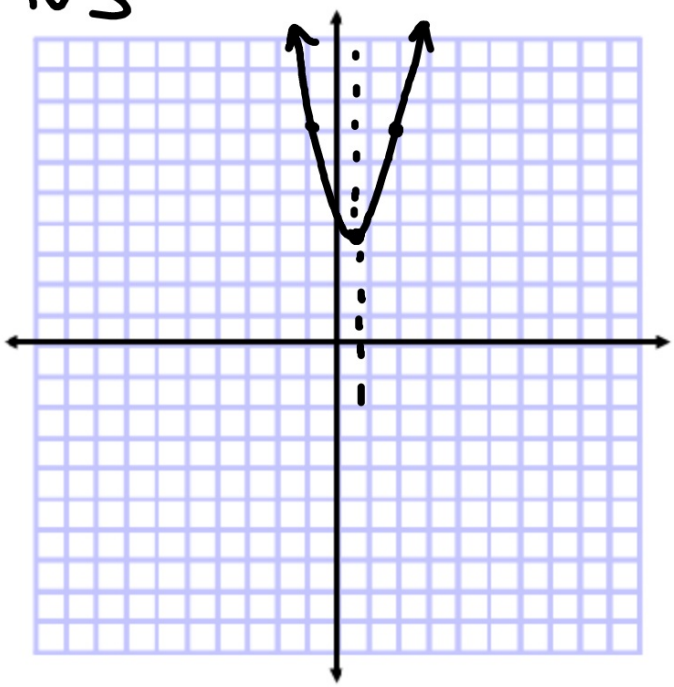


	$x^2 - 10x + 25$	
(5)	$25 - 50 + 25$	0
6	$36 - 60 + 25$	1
7	$49 - 70 + 25$	4

Example 3 No Real Roots

Solve $2x^2 - 3x + 5 = 0$ by graphing.

NS



$x = \frac{3}{4} = 0.75$

x	$2x^2 - 3x + 5$	
0.75	$2(.75)^2 - 3(.75) + 5$	3.9
	$1.125 - 2.25 + 5$	
2	$2 \cdot 4 - 3 \cdot 2 + 5$	7
	$8 - 6 + 5$	

complex number

NS

Solve each equation by graphing.

p 558 11-29 o

WB 9.2 skills 1-8

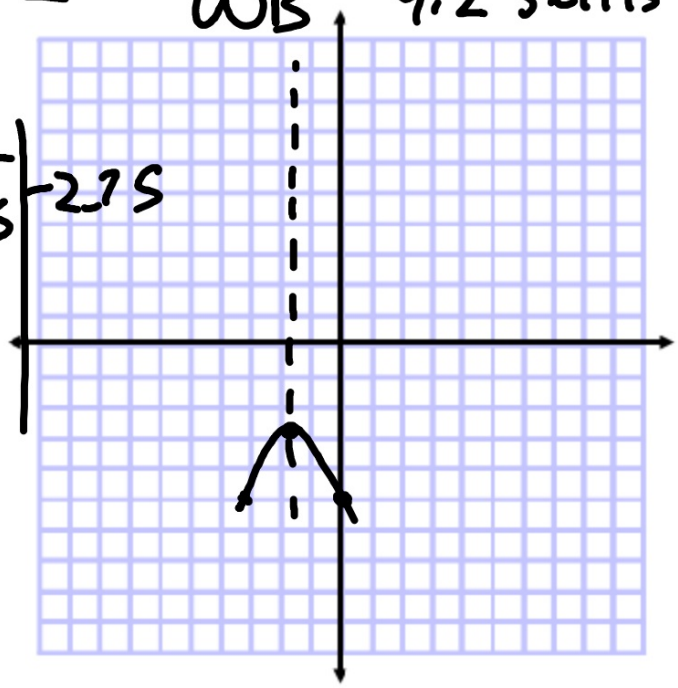
3A. $-x^2 - 3x = 5$

$x = \frac{3}{-2}$

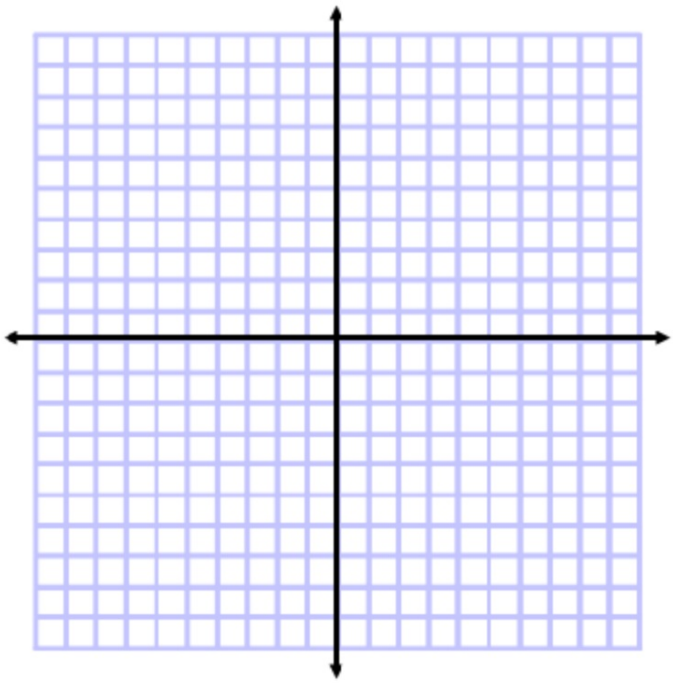
$y = -x^2 - 3x - 5$

$-1 \cdot x \cdot x$

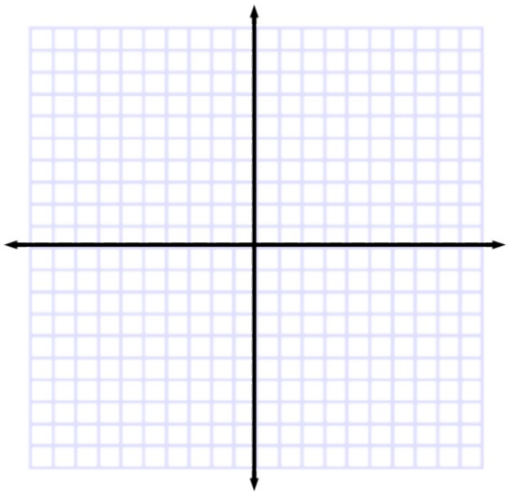
-1.5	$-1(-1.5)(-1.5) - 3(-1.5) - 5$	-2.75
	$-2.25 + 4.5 - 5$	
0	$-0^2 - 3 \cdot 0 - 5$	-5



3B. $-2x^2 - 8 = 6x$



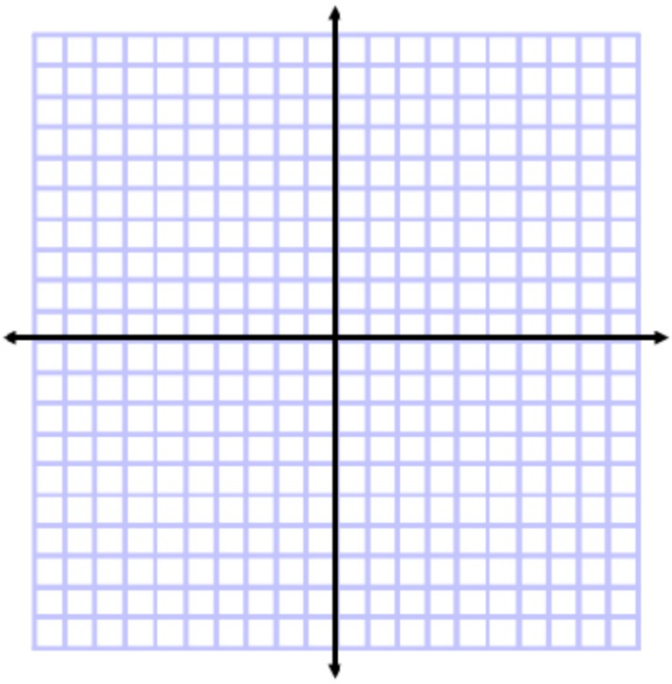
What if the answer isn't an integer?
What is it between?
$y= x^2 +3x - 1$



Example 4 Approximate Roots with a Table

Solve $x^2 + 6x + 6 = 0$ by graphing. If integral roots cannot be found, estimate the roots to the nearest tenth.

if not integers…
what is it between?
vs
nearest tenth?



What is it between?
vs
nearest tenth?

GuidedPractice

4. Solve $2x^2 + 6x - 3 = 0$ by graphing. If integral roots cannot be found, ~~estimate the roots to the nearest tenth~~.