Algebra 1 9.2

Solve quadratic equations by graphing

Estimate quadratic solutions by graphing

Solution → x-int.

Root

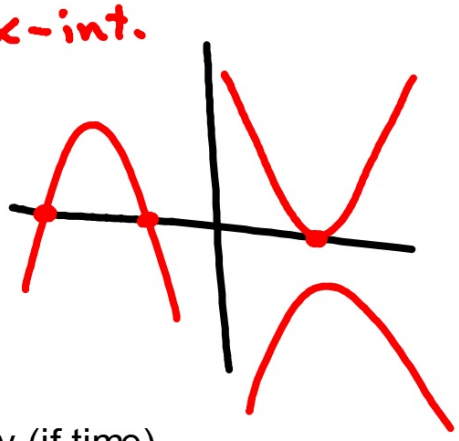
x-intercept

Double root

standard form

equation

related function



Whiteboards

Matching activity (if time)

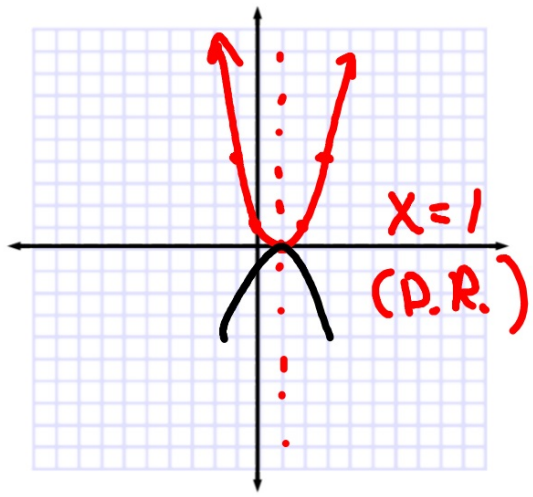
15 $x^2 = 2x - 1$

$+1 \quad -2x \quad -2x + 1$

$x^2 - 2x + 1 = 0$

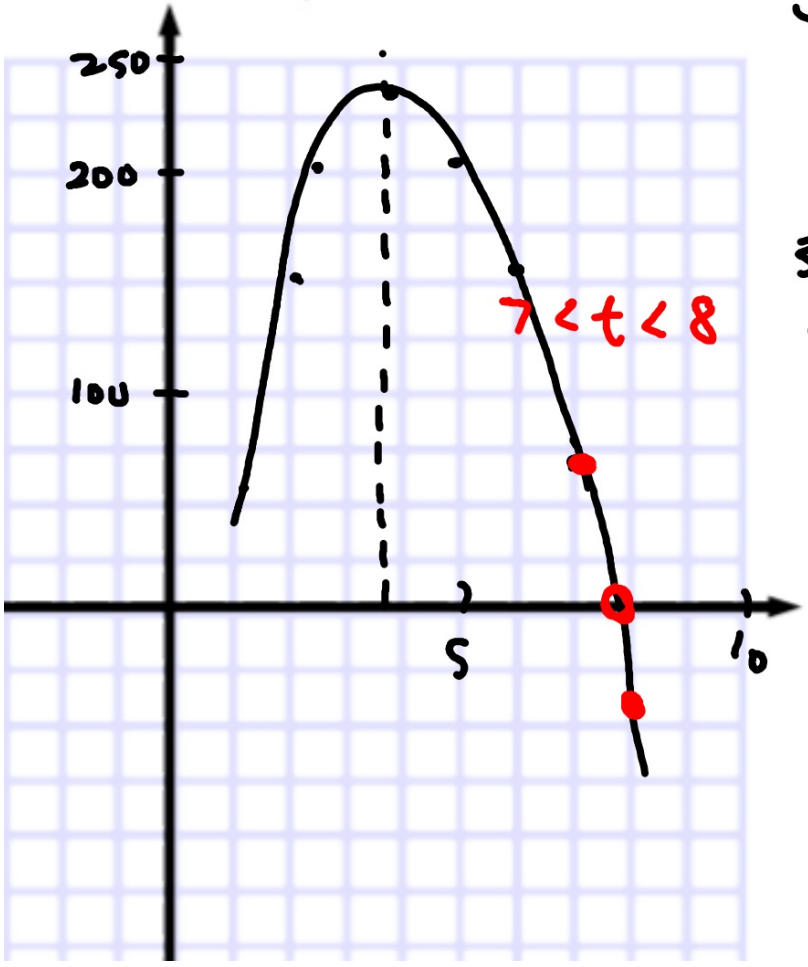
$y = x^2 - 2x + 1$

$b = \frac{-b}{2a} = \frac{2}{2} = 1$




| | $x^2 - 2x + 1$ | |
|---|---|---|
| 1 | $1 \cdot 1 - 2 \cdot 1 + 1$ | 0 |
| 2 | $4 - 4 + 1$ | 1 |
| 3 | $9 - 6 + 1$ | 4 |

29. (b) $h = -16t^2 + 122t$



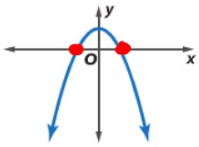

$y = -16t^2 + 122t$

$\frac{-122}{-32} = 3.8$

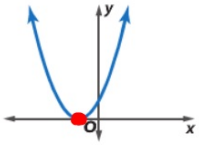
| | $-16t^2 + 122t$ | |
|---|---|---|
| 3.8 | $-231.0 + 463.6$ | 232.6 |
| 5 | $-400 + 610$ | 210 |
| 6 | $-576 + 732$ | 156 |
| 7 | $-784 + 854$ | 70 |
| 8 | $-1024 + 976$ | $-48$ |

Between 7 & 8 sec.

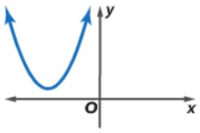
**KeyConcept** Solutions of Quadratic Equations




*two* unique real solutions

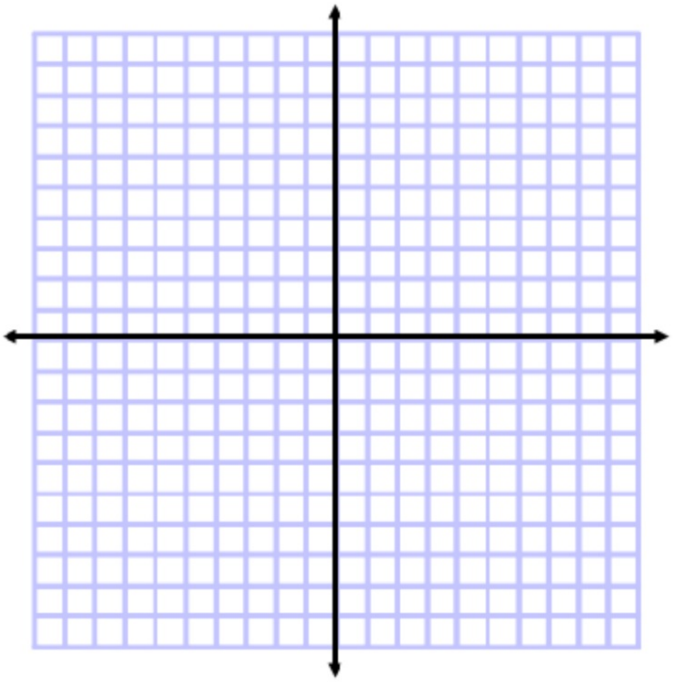



*one* unique real solution




*no* real solutions

D R



Solve by graphing: Where does the graph cross the x-axis?

"x-intercept(s)"

1. Rearrange as necessary (= 0)
2. Graph the related function
3. Answer the question

(Between)

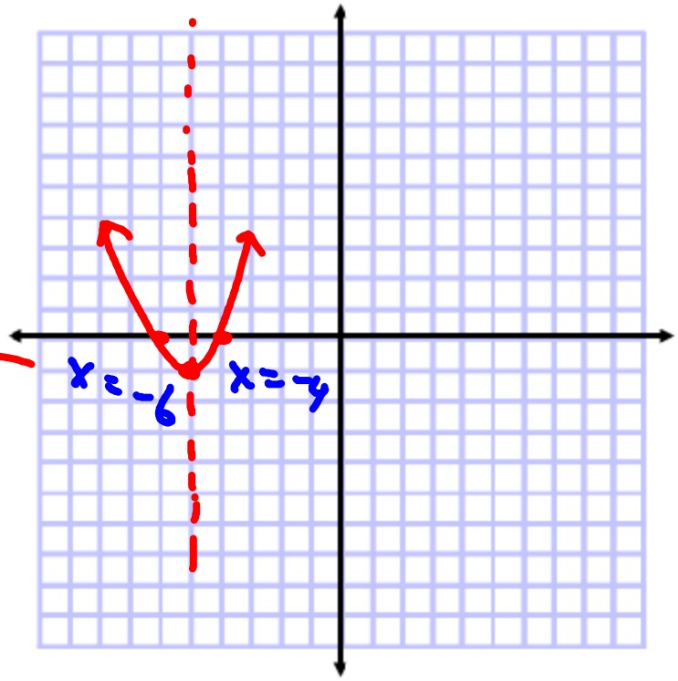
$x = \frac{-b}{2a} = \frac{-10}{2 \cdot 1} = -5$

Solve by graphing

$x^2 + 10x + 24 = 0$

$y = x^2 + 10x + 24$

| | | |
|---|---|---|
| $-5$ | $25 + -50 + 24$ | $-1$ |
| $-4$ | $16 + -40 + 24$ | $0$ |



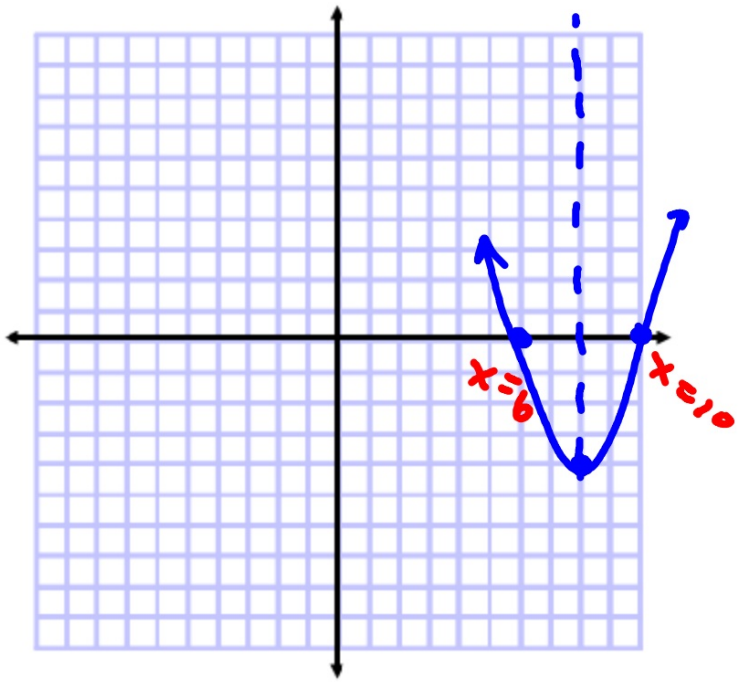
$\frac{16}{2 \cdot 1} = 8$

$1x^2 - 16x = -60$

$+60 \quad +60$

$y = x^2 - 16x + 60$

| | | |
|---|---|---|
| 8 | $64 - 128 + 60$ | $-4$ |
| 10 | $100 - 160 + 60$ | $0$ |



Matching activity:
Find the person who has the match for your card.

Solve each equation by graphing.

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

NS

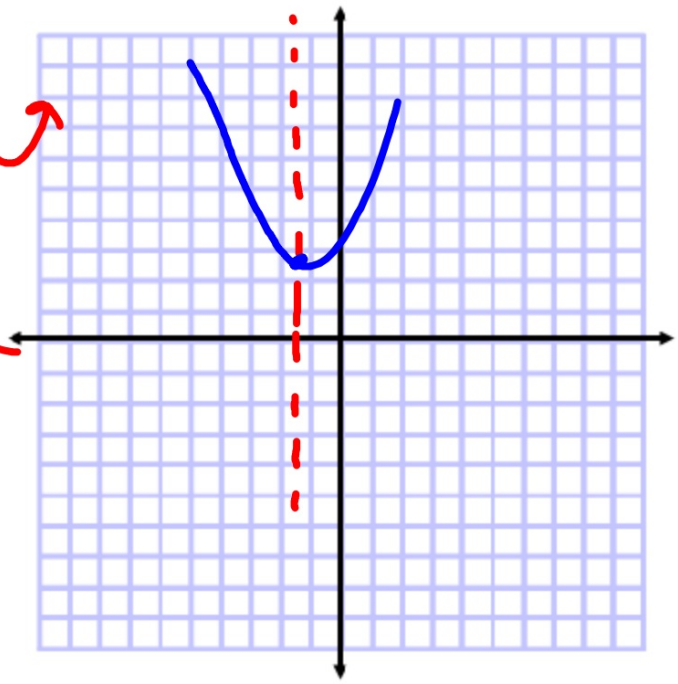
$-5 \quad -5$

$-x^2 - 3x - 5 = 0$

$0 = 1x^2 + 3x + 5$

$x = \frac{-3}{2} = -1.5$

| $x$ | $x^2 + 3x + 5$ | $y$ |
|---|---|---|
| $-1.5$ | $2.25 + -4.5 + 5$ | $2.75$ |



$x = \frac{-6}{2} = -3$

**Example 4** Approximate Roots with a Table

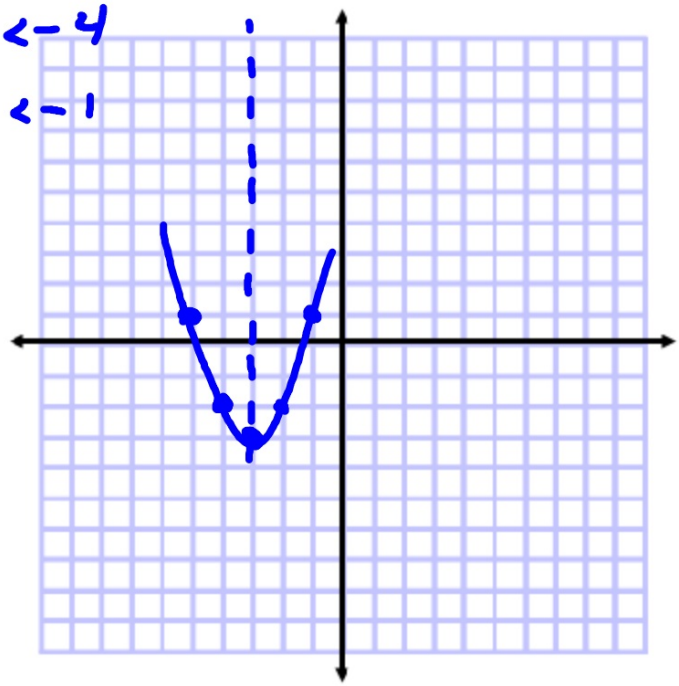
Solve $x^2 + 6x + 6 = 0$ by graphing. If integral roots cannot be found, estimate the roots to the nearest tenth.

If they are not integers... what are they between? (change in instructions)

$y = x^2 + 6x + 6$ $\quad -5 < x < -4$

$-2 < x < -1$

| | | |
|---|---|---|
| $-3$ | $9 + -18 + 6$ | $-3$ |
| $-5$ | $25 + -30 + 6$ | $1$ |
| $-4$ | $16 + -24 + 6$ | $-2$ |



## GuidedPractice

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