Algebra 2 4.2

Solve quadratic equations by graphing

Estimate solutions of quadratic equations by graphing

Write and solve quadratic equations

p.s. not everything is factorable

quadratic function

quadratic equation

standard form $f(x) = ax^2 + bx + c$

zero(s) } x-int.

root(s) }

no solution

double root

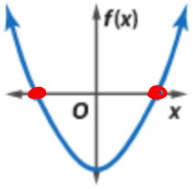
whiteboards

KeyConcept Solutions of a Quadratic Equation

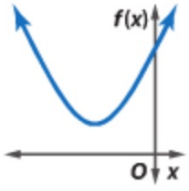
Words A quadratic equation can have one real solution, two real solutions, or no real solutions.

Models

one real solution



two real solutions



no real solution

"double root"

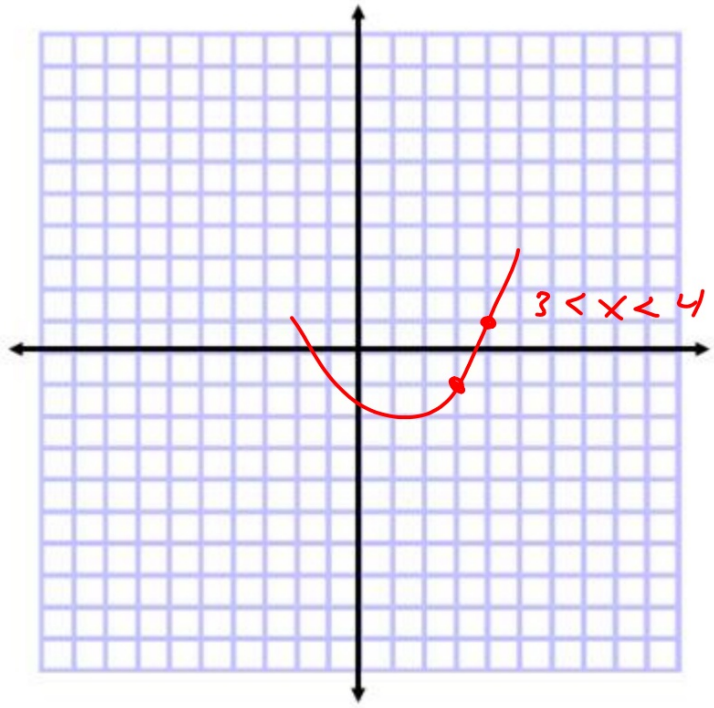
Example 4 Estimate Roots

Solve $x^2 - 6x + 4 = 0$ by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located.

$y = x^2 - 6x + 4$

4

−6



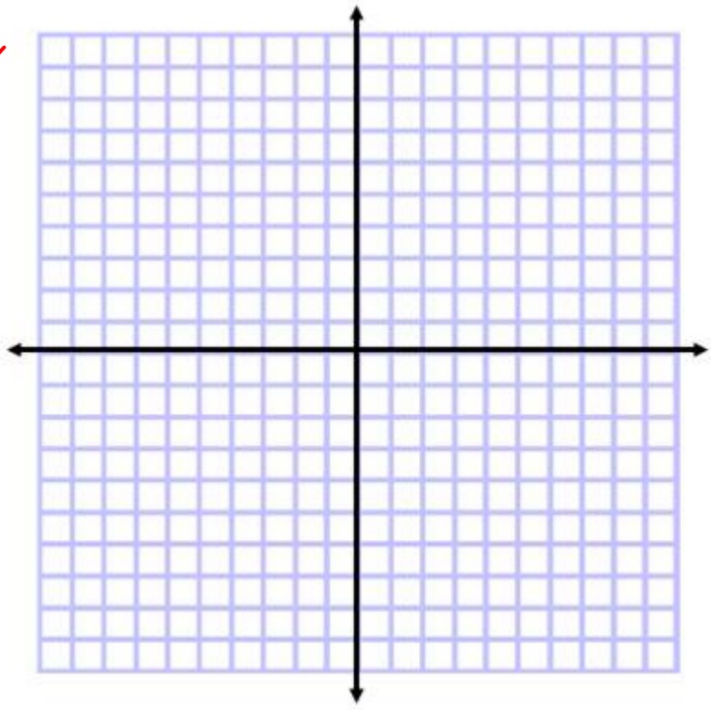
GuidedPractice

4. Solve $x^2 - x - 10 = 0$ by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located.

$y = x^2 - x - 10$

-10

-1



Guess and check does not count!

$x = 6$ or -4
$y = -4$ or 6

12. NUMBER THEORY Use a quadratic equation to find two real numbers with a sum of 2 and a product of −24.

$x + y = 2 \rightarrow y = 2 - x$

$x(y) = -24$

$x(2 - x) = -24$

$2x - x^2 = -24$

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

$x^2 - 2x - 24 = 0$

$y = x^2 - 2x - 24$

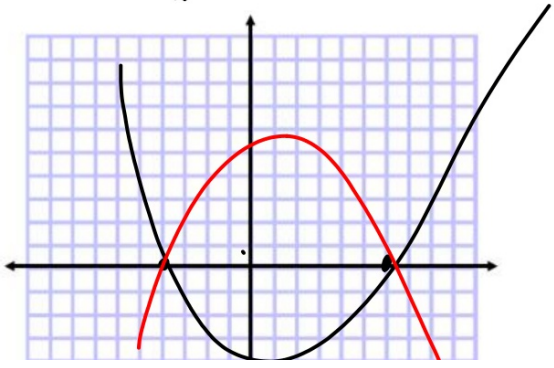
$= (x - 6)(x + 4)$

$x - 6 = 0$ $\quad x + 4 = 0$

$x = 6$ $\quad x = -4$

-24, -6, 4, 2

Write eq and graph:



NUMBER THEORY Use a quadratic equation to find two real numbers that satisfy each situation, or show that no such numbers exist.

33 Their sum is −15, and their product is −54.

$x = 3$
$y = -18$

$x = -18$
$y = 3$

$y + x = -15 \rightarrow y = -x - 15$

$xy = -54$

$x(-x - 15) = -54$

$-x^2 - 15x = -54$

$0 = x^2 + 15x - 54$

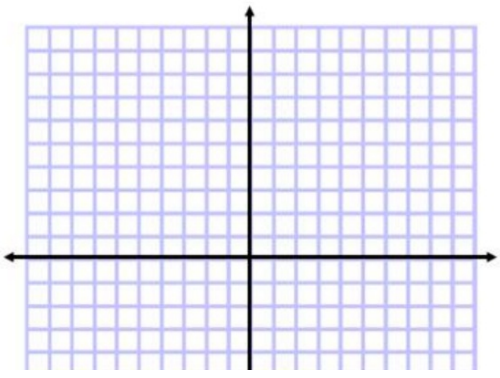
$0 = (x - 3)(x + 18)$

$x - 3 = 0$
$x = 3$

$x + 18 = 0$
$x = -18$

-54
$1 \quad 54$
$2 \quad 27$
$-3 \quad +18$

Write eq & graph



$x =$
$y =$

34. Their sum is 4, and their product is -117.

$x + y = 4 \quad y = 4 - x$

$xy = -117$

$x(4-x) = -117$

$4x - x^2 = -117$

$0 = x^2 - 4x - 117$

-117

-4

-117	
1	117
3	39
9	-13

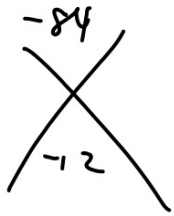
35. Their sum is 12, and their product is −84.

$x + y = 12 \quad y = 12 - x$

$x y = -84$

$x(12 - x) = -84$

$12x - x^2 = -84 \quad 0 = x^2 - 12x - 84$



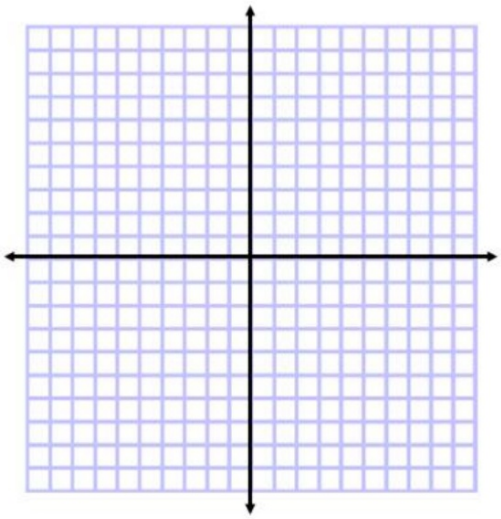
−84
1 84
2 42
3 28
4 21
6 14
7 12

Example 3 No Real Solution

NUMBER THEORY Use a quadratic equation to find two real numbers with a sum of 15 and a product of 63.

$x + y = 15$

$xy = 63$



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