College Algebra

3.3 Quadratic Equations

With your group come up with as many ways to solve a quadratic equation, $ax^2 + bx + c = 0$ as you can.

Zero Product Property

If a and b are complex numbers, and ab=0 then either a=0 or b=0, or both.

$(x+8)(x-7)=0$

Working backwards, what would the values of a,b, and c be for x=2,9?

Ex. 1

Solve $x^2 + 9x + 8 = -12$ by factoring.

Square roots

Ex. 2

Solve algebraically and check using your calculator

(a) $x^2=16$ (b) $3x^2=-27$ (c) $2(x-1)^2=16$

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Completing the square:

$ax^2 + bx = c$

Ex. 3

Solve $x^2 - 6x + 7=0$

Ex. 4

Solve $3x^2 - 6x + 4=0$

Ex. 5

Solve $8x^2 + 2x - 3 = 0$

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The Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The discriminant of a quadratic equation
$b^2 - 4ac$
determines the number of real solutions of a quadratic equation.

$b^2 - 4ac > 0$

$b^2 - 4ac = 0$

$b^2 - 4ac < 0$

Ex. 6

Determine how many solutions there are then find all solutions of $2x^2 - x + 4 = 0$

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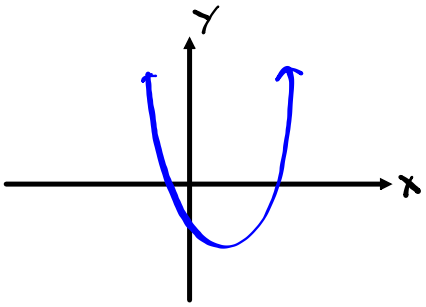
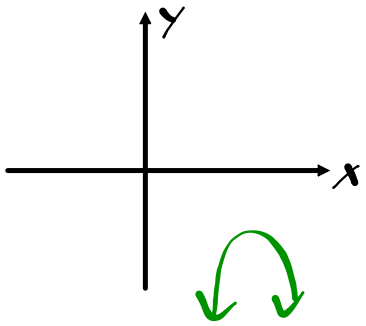
Solving Quadratic Inequalities

$ax^2+bx+c < 0$ or $>, \leq, \geq$





Ex. 7

Solve $x^2 + 7x + 12 < 0$

Ex. 8

Solve $2x^2 \geq - 5x + 12 < 0$

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Ex. 9

Solve

(a) $SA=\pi d^2/4$ for d

(b) $rt^2-st - k=0$ for t

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