9.6 The Quadratic Formula

The BIG Idea...

Any quadratic equation can be solved by the quadratic formula.

The Quadratic Formula

if $ax^2+bx+c=0$, then

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

Example:

$$x^2-5x+4=0$$

$$x=\frac{5\pm\sqrt{(-5)^2 2-4(1)(4)}}{2(1)}$$

$$x=\frac{5\pm\sqrt{9}}{2}$$

$$x=\frac{5\pm3}{2}=\boxed{4,1}$$

If the quadratic formula always works, why do we have other methods??

$$x^2+9x+14=0$$

$$x=\frac{-9\pm\sqrt{(9)^2-4(1)(14)}}{2(1)}$$

$$x=\frac{-9\pm\sqrt{25}}{2}$$

$$x=\frac{-9\pm5}{2}$$

$$x=-2,-7$$

$$x^2+9x+14=0$$

$$(x+2)(x+7)=0$$

$$x=-2,-7$$

Use the quadratic formula to solve.

1) $x^2-8x=-12$

2) $x^2+6x-17=0$

Use the quadratic formula to solve.

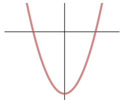
3) $-2x^2+5x+7=0$

4) $9x^2-30x+25=0$

The discriminant is the expression inside the radical of the quadratic formula... $b^2 - 4ac$

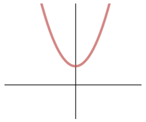
$b^2 - 4ac > 0$

2 real solutions

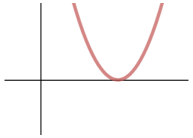


$b^2 - 4ac < 0$

no real solutions



$b^2 - 4ac = 0$ → 1 real solution



Find the number of real solutions.

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

6) $x^2 + 6x + 10 = 0$

7) $x^2 - 12x + 36 = 0$