

Trig4.2

Solve quadratic equations (factor, CTS, QF)*

Use the discriminant to describe roots

completing the square

quadratic formula

*Algebra 2 Ch. 6

Also Alg.1

discriminant

(nature of the roots)

conjugates

Quadratic formula song

Algebra tiles

$$x^2 + 6x + 9$$

$$x^2 + 10x + 25$$

Complete the **square** (what is missing?)

$$x^2 + 8x + 9 \rightarrow (x + 4)^2$$

$$x^2 - 6x + 5 \rightarrow (x - 3)^2$$

Solve each equation by completing the square.

$$5x^2 + 8x - 20 = 0$$

+20 +20

$$x^2 + 8x + 16 = 20 + 16$$

$$\sqrt{(x+4)^2} = \sqrt{36}$$

$$x+4 = \pm 6$$

$$x =$$

$$\begin{array}{r} x+4=6 \\ -4 \quad -4 \\ \hline x=2 \end{array}$$

$$\begin{array}{r} x+4=-6 \\ -4 \quad -4 \\ \hline x=-10 \end{array}$$

Build a perfect square...

$$\frac{1}{3} \cdot \frac{1}{2} \quad \frac{1}{6} \cdot \frac{1}{6}$$

:(Only complete ONE square!

2 Solve $\frac{3n^2}{3} + \frac{7n}{3} + \frac{7}{3} = 0$ by completing the square.

$$n^2 + \frac{7}{3}n + \frac{49}{36} = -\frac{7}{3} + \frac{49}{36}$$

$$\sqrt{\left(n + \frac{7}{6}\right)^2} = \sqrt{-\frac{35}{36}}$$

$$n + \frac{7}{6} = \pm \frac{i\sqrt{35}}{6}$$

$$i \cdot i = -1$$

$$n = -\frac{7}{6} \pm \frac{i\sqrt{35}}{6}$$

$$n + \frac{7}{6} = \frac{i\sqrt{35}}{6}$$

$$\boxed{-\frac{7}{6} + \frac{i\sqrt{35}}{6}}$$

$$n + \frac{7}{6} = -\frac{i\sqrt{35}}{6}$$

$$\boxed{n = -\frac{7}{6} - \frac{i\sqrt{35}}{6}}$$

How do you choose a method to solve???

1 Solve $x^2 - 6x - 16 = 0$.

+16 +16

$$x^2 - 6x + 9 = 16 + 9$$

$$(x - 3)^2 = 25$$

$$x - 3 = \pm 5$$

Options:

$$x - 3 = 5 + 3 = 8$$

$$x - 3 = -5 + 3 = -2$$

QF song!

**Quadratic
Formula**

The roots of a quadratic equation of the form $ax^2 + bx + c = 0$ with $a \neq 0$ are given by the following formula.

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

Solve each equation.

28. $3s^2 - 5s + 9 = 0$

$$\frac{3}{2} \cdot \frac{3}{2}$$

$$x - \frac{3}{2} = \frac{11}{2} = 7$$

$$x - \frac{3}{2} = -\frac{11}{2} = -4 \quad x =$$

29. $x^2 - 3x - 28 = 0$

$$x^2 - 3x - 28 = 0$$

$$x^2 - 3x + \frac{9}{4} = 28 + \frac{9}{4}$$

$$\sqrt{\left(x - \frac{3}{2}\right)^2} = \sqrt{\frac{121}{4}}$$

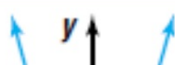
$$x - \frac{3}{2} = \pm \frac{11}{2}$$

Choice of method

discriminant $b^2 - 4ac$

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

Where have you seen b^2-4ac before?

Discriminant	Nature of Roots/Zeros	Graph
		

"nature of the roots" is not the same question as "solve"

$$A=1 \quad B=-4 \quad C=15 \quad x = \frac{4 \pm \sqrt{-44}}{2}$$

- 4 Find the discriminant of $x^2 - 4x + 15 = 0$ and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

⊕ 2 real P.S. = rational not P.S. irrat
0 1 real
⊖ 2 imag

$$(-4)^2 - 4 \cdot 1(15)$$
$$16 - 60 = -44$$

Find the discriminant of each equation and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

7. $m^2 + 12m + 36 = 0$

8. $t^2 - 6t + 13 = 0$

Find the discriminant of each equation and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

20. $6m^2 + 7m - 3 = 0$

21. $s^2 - 5s + 9 = 0$

22. $36d^2 - 84d + 49 = 0$

23. $4x^2 - 2x + 9 = 0$